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SCOTTISH

CRYPTOGAMIC FLORA.

SCOTTISH

CRYPTOGAMIC FLORA,

OR

COLOURED FIGURES AND DESCRIPTIONS OF CRYPTOGAMIC PLANTS, BELONGING CHIEFLY TO THE ORDER *FUNGI;*

AND

INTENDED TO SERVE AS A CONTINUATION

OF

ENGLISH BOTANY.

BY

ROBERT KAYE GREVILLE, F.R.S. & F.A.S.E.

CORRESPONDING MEMBER OF THE NATURAL HISTORY SOCIETY OF PARIS; MEMBER OF THE IMPERIAL ACADEMY NATURÆ CURIOSORUM; OF THE WERNERIAN NATURAL HISTORY SOCIETY; HONORARY MEMBER OF THE YORKSHIRE PHILOSOPHICAL SOCIETY, *&c. &c.*

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Cui bono hæc omnia?—Ut cognoscamus sapientiam CREATORIS, quæ in minimis non minus elucet, quam in magnis plantis.—DILL.

VOL. I.

EDINBURGH:

PRINTED FOR MACLACHLAN & STEWART, EDINBURGH; AND BALDWIN, CRADOCK & JOY, LONDON.

1823.

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TO

WILLIAM JACKSON HOOKER,

LL.D., F.R.S., F.L.S.,

REGIUS PROFESSOR OF BOTANY IN THE UNIVERSITY OF GLASGOW,

&c. &c.

THIS WORK IS DEDICATED,

AS A TRIBUTE OF ADMIRATION,

NOT LESS

THAN A PROOF OF THE MOST AFFECTIONATE

REGARD AND ESTEEM,

BY

ROBERT KAYE GREVILLE.

ADVERTISEMENT.

THIS Work is principally intended to supply a desideratum which has long been experienced in this country,—that of a scientific illustration of the FUNGI.

The Author is at the same time ambitious that it should be regarded in the light of a continuation of that admirable Work, the ENGLISH BOTANY of SMITH and SOWERBY; which only wants the *Fungi* to constitute it a very complete Flora of the plants of Great Britain. To render this object more effectual, all other Cryptogamic native plants, discovered since the termination of that work, will also be figured and described.

To Scotland, so fruitful in Cryptogamic treasures, the Author is desirous that his undertaking should be more peculiarly national. It is one of the first periodical works on Natural History to which she has given birth; and no exertions shall be wanting to render it worthy of her encouragement. Her *Flora*, to the extent of the Author's views, will be first completed. Those plants shall be afterwards published, which are found to be confined to other parts of our Island; but so rich is the north of Great Britain in plants of the Class Cryptogamia, that a small number only of supplementary fasciculi will be required for that purpose. The last Number will be accompanied by a General Index and a Synoptical Arrangement of all British Cryptogamic vegetables.

EDINBURGH,
May 1823.

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R. K. Greville Sculp. Cranes Delin.

SCLEROTIUM DURUM.

Hard Black Sclerotium.

CLASS AND ORDER CRYPTOGAMIA, FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI? Link, Grev.*—Part of FUNGI, *Juss. De Cand. Hook.*

GENERIC CHARACTER.

Massa subglobosa aut difformis, intùs vesiculosa, carnosa vel cornea, externe in nonnullis demum corrugata; sporulæ incognitæ.

A somewhat globular or shapeless mass, vesiculose and fleshy or horny within, the surface, in some species, becoming wrinkled; sporules have not been observed.

SPECIFIC CHARACTER.

SCLEROTIUM durum; *elongatum vel ovatum, corneum, demum substriatum, intùs candidum.*

S. oval or elongated, hard and tenacious, the surface in old specimens somewhat striated or rugose; white within.

SCLEROTIUM durum, *Pers. Syn. Fung.* p. 121.—*Alb. et Schw. Conspect. Fung.* p. 74.—*Decand. Fl. Franç.* v. ii. p. 277.; *Ejusd. Syn.* p. 58.; *et Mém. du Mus.* v. ii. p. 415. t. 14. f. 3.—*Hook. Fl. Scot.* Pt. 2. p. 10.—*Grev. Fl. Edin. ined.*

SPHÆRIA solida, *Sow. Eng. Fung.* t. 314.—*Purt, Midl. Fl.* v. 2. p. 713. et v. 3. p. 493.—*Rehl. Fl. Cantab.* ed. 3. p. 573.

ASTOMA solidum, *Gray's Nat. Arr.* v. 2. p. 524.

HAB.—On the dead stems of the larger herbaceous plants, particularly potato stalks, and the larger *Umbelliferæ;* in autumn, winter, and spring, very common.

Form generally oblong, and somewhat depressed, but, from many individuals becoming confluent, it frequently assumes a linear character, for one or two inches; within, the structure is extremely simple, presenting nothing more than an uniform white and hard substance, altogether destitute of veins, or any trace of sporules; unless, indeed, it be towards the surface, where, when a very thin slice is placed under the power of the microscope, a vesiculose substance is observable; but whether this structure is essential to the external coat, or connected with the production of sporules, I have not been able to determine. The exterior of the plant becomes substriated, or even subrugose, after arriving at maturity, and being deprived of the covering of the epidermis, under which it is produced.

THIS genus was first established by TODE, in his *Fungi Mecklenbergenses selecti*, with an excellent character. PERSOON continued the genus, but added to it, two other groupes of minute plants, possessing no affinity with it, and which have since been described by DECANDOLLE, under the names of *Erysiphe* and *Rhizoctonia*. Sclerotium, as well defined by TODE and DECANDOLLE, contains, according to the excellent history of the genus published by the latter author, in the 2d volume of *Mémoires du Museum d'Histoire Naturelle*, 30 species: these are tolerably uniform in structure, though very variable in appearance; and notwithstanding the light thrown upon them in the above-quoted memoir, they may be considered as a group very little understood.

SOWERBY's *Sphæria solida*, is truly the plant in question; the "*spiculæ*" observed and figured by him being only extraneous bodies.

Fig. 1. *Plants, natural size.* Fig. 2. *A single plant.* Fig. 3. *A section.* Fig. 4. *A thin slice.—All except* Fig. 1. *more or less magnified.*

AGARICUS FLOCCOSUS.

Shaggy Agaric.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Juss. De Cand. Hook. Grev.*

GENERIC CHARACTER.

Pileus stipitatus, aut latere affixus, subtus lamellis sporiferis rectis simplicibus: volva nulla.

Pileus furnished with a stem, or fixed by its side, bearing on the under surface straight and simple lamellæ (gills) radiating from a centre, and containing sporules; volva (wrapper) none.

SPECIFIC CHARACTER.

AGARICUS floccosus, *cæspitosus; pileo carnoso, croceo-ferrugineo, piloso-squamoso; squamis revolutis; stipite squarroso, deorsum attenuato.*

Ag. growing in tufts; pileus fleshy, brownish or reddish-yellow, scaly, with stiff and fasciculated hairs; scales revolute; stem squarrose with scales, attenuated at the base.

AGARICUS floccosus, *Curt. & Hook. in Fl. Lond.* ed. 1. & 2.—*Sow. Eng. Fung.* t. 284.—*With. Bot. Arr.* ed. 6. v. 4. p. 326.—*Relh. Fl. Cantab.* ed. 3. p. 536.—*Purt, Midl. Fl.* v. 2. p. 645. & v. 3. p. 415.—*Schæff. Fung.* t. 61.

AGARICUS squarrosus, *Fries*, v. 1. p. 243.—*Pers. Syn. Fung.* p. 268.—*Alb. et Schw. Conspect. Fung.* p. 148.

AGARICUS squamosus, *Bull.* t. 266.—*De Cand. Fl. Franç.* v. 2. p. 201.—*Ejusd. Syn.* p. 41.—*Merat, Nouv. Fl. de Par.* v. 1. p. 84.—*Purt. Midl. Fl.* v. 2. p. 634. & v. 3. p. 404.?

AMANITA, *Fl. Dan.* t. 491.?

LEPIOTA squarrosa, *Gray's Nat. Arr.* v. 1. p. 602.

HAB. On decaying stumps of various trees, but particularly of the ash, and most abundantly in the autumn. The specimens from which my drawing was made, were gathered in the grounds of DAVID FALCONER, Esq. Carlowrie.

Growing in tufts, frequently numerous. *Cap* 1—4 inches across, various in form, but always more or less convex; sometimes obtusely umbonate, (*bossed*, of WITHERING); surface, scattered with tufts of hairs collected into rigid bristly points, somewhat erect and revolute, rarely adpressed: margin rather rounded, often ragged, from the remains of a part of the veil; *colour*, rich brownish or reddish yellow. *Gills* numerous, irregular, rather narrow, pale, with a greenish hue. *Stem* 3—6 inches high,

thickish, similar in colour to the cap, but darker towards the base, which is generally attenuated, but sometimes equal; rugged, with brown scaly tufts, generally though not always solid. *Veil*, ragged, brown, surrounding the stem in the form of a collar, and remaining for a considerable time. *Flesh*, firm, thick, whitish, often with a tinge of yellow or green.

Few names have been more confused than those of *Agaricus squamosus* and *squarrosus*, and to clear up all the errors connected with them would be perhaps impossible. My limits will only allow me to say, that, in the synonymes quoted, I have not inserted one authority that I have not minutely examined. Between *Ag. squamosus* and *squarrosus*, as described by WITHERING I can see no essential difference, although Mr PURTON keeps them distinct; and so convinced is FRIES also of this, that he retains *Ag. squamosus* of PERSOON,—a plant with a totally different habit. The figure in *Fl. Londinensis* is an excellent representation of one of the varieties of this plant, as also is that in SOWERBY's *English Fungi*.

How desirable it is that the Genus *Agaricus* should be divided, every one will be ready to admit. Above 300 pages of the recent admirable work by M. FRIES, is given up to concise descriptions of the species; yet an application of twenty years has been insufficient to enable him to form new genera out of such an accumulated mass of materials! NEES VON ESENBECK has done something towards the formation of generic groups; and LINK has in a partial degree also attempted it. But hitherto nothing completely satisfactory has appeared on the subject. It may be proper here to mention, that Mr GRAY has made genera of several of the old divisions of Agaricus; but in order to produce a systematic effect, he has been compelled to omit many well known British species.

Fig. 1. *Tuft of plants, natural size.* Fig. 2. *A section of the pileus.*

ISARIA MICROSCOPICA.

Least Isaria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Lin.*—NAT. ORD. *BYSSOIDEÆ, Grev.* MUSCEDINES, *Link.*—Part of FUNGI, *De Cand.*

GENERIC CHARACTER.

Filum (vel receptaculum elongatum) erectum, simplex clavatum, aut ramosum, floccis simplicibus ramosisve tectum; sporidia floccis inspersa.

A minute body, forming an elongated receptacle, somewhat filiform, erect, either simple and club-shaped, or branched, clothed with very minute filaments, intermixed with sporules.

SPECIFIC CHARACTER.

ISARIA microscopica, *minutissima, sparsa, solitaria, simplex, clavata, candida, floccis et sporidiis indistinctis.*

I. extremely minute, scattered, solitary, simple, club-shaped, very white, the minute filaments and sporules very indistinct.

ISARIA microscopica, *Grev. Fl. Edin. ined.*

HAB. On *Trichia clavata*, in damp places. My specimens were gathered in Auchindenny Woods, early in spring.

Excessively minute, requiring a high power of the microscope to examine it; regularly club-shaped, very pure white, with a slightly unequal surface; fixed at the base by a few white radiating fibres.

From the singular habitat of this little parasite, I concluded, before examination, that it could be no other than *Stilbum tomentosum* of PERSOON's Synopsis, which is *St. parasiticum* of DITMAR, who has given an excellent figure of it in STURM's *Deutschlands Flora*. The absence, however, of the round head and tomentose stem in my plant, rendered the difference at a single glance sufficiently striking; nor indeed could there be any doubt of its belonging to a different genus. With Isaria it agrees in all respects, except in the apparent absence

of the minute filaments, among which the sporules of that genus are dispersed; but in so minute a plant, circumstances may easily be supposed to have rendered them indistinct.

Fig. 1. *Plants, natural size, on Trichia clavata.* Fig. 2. *The same, highly magnified.*

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ÆCIDIUM THALICTRI.

Meadow-Rue Æcidium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Lin.*—NAT. ORD. *GASTROMYCI, Grev. (not of Link).*—Part of EPIPHYTÆ, *Link.*—Part of FUNGI, *Hook.*

GENERIC CHARACTER.

Peridia in foliis vivis parasitica, teretia, membranacea, apice dehiscentia; ore plerumque dentato; sporidia globosa minutissima, libera, pulverulenta.

Peridium (membrane enclosing the sporidia) parasitic on living leaves; smooth, membranaceous, bursting at the apex; mouth generally dentated; sporidia (little roundish bodies containing sporules) very minute, free, and dust-like.

SPECIFIC CHARACTER.

ÆCIDIUM thalictri; *hypophyllum, subglomeratum; cæspitulis subrotundis; peridiis oblongo-cylindricis, aurantiacis; ore pallido, irregulariter dehiscente.*

Æ. growing on the under surface of the leaf; somewhat clustered; clusters of a roundish form; peridia oblongo-cylindrical, bright orange; the mouth paler, and bursting irregularly.

HAB. On the petioles and the under surface of the leaves of *Thalictrum alpinum.* Ben Voirlich, near Loch Lomond.

Bursting from *beneath* the epidermis of the leaf, in small roundish clusters, without deforming the part on which it is parasitic. *Peridia* for the most part oblong, very bright orange, somewhat contracted at the mouth, which is of a paler colour, and irregularly torn. *Sporidia* bright orange, numerous, globose.

The present plant belongs to that division of *Cæoma* named *Ræstelia* by LINK, and most injudiciously made a new genus by Mr GRAY, who, in his Natural Arrangement of British Plants, gives LINK as an authority for the genus, without noticing that that celebrated Professor considered it merely as a division. *Ræstelia*, by all other authors, is not considered as distinct from *Æcidium*, the only difference being the elongated peridia; several specimens in my possession, of more

than one species, are exactly intermediate; and *Rœstelia* itself is by no means constant to its character. The genus *Cœoma* of LINK and NEES VON ESENBECK, which includes *Æcidium*, *Uredo*, and part of *Puccinia*, is too comprehensive, as it unites plants which, I hope to be able to prove, are really deserving the rank of true genera.

This beautiful species was discovered on Ben Voirlich by Mr PATTERSON, in one of Dr HOOKER's excursions to Ben Lomond and the neighbouring mountains in 1821: since which time I have received a specimen from Mr ARNOTT, gathered by Mr MACRITCHIE in the Highlands.

Fig. 1. *Plants, natural size.* Fig. 2. *Ditto, magnified.* Fig. 3. *A cluster; and,* Fig. 4. *Sporidia, both highly magnified.*

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PEZIZA OCHRACEA.

Ochraceous-brown Pezïza.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, De Cand. Hook. Grev.*

GENERIC CHARACTER.

Pileus stipitatus aut sessilis, majus minusve cupuliformis, cellulis elongatatis sporuliferis, in pagina superiore.

Plant sessile or stipitated, dilated upwards into a variably cup-shaped or flat receptacle, having sporules contained in elongated cells, whose summits terminate on the superior surface.

SPECIFIC CHARACTER.

PEZIZA ochracea; *minuta, sessilis, carnosa, crassa, ochraceo-fusca, plana vel subconvexa, subtus glabra; hymenio quasi granulis nitidis sparso.*

P. minute, sessile, fleshy, thick, yellowish-brown, plane or subconvex, smooth beneath; hymenium, or fructifying surface, sprinkled, as it were, with granular shining particles.

PEZIZA ochracea, *Grev. Fl. Edin. ined.*

HAB. On the bark of a fallen tree, at Braid Hermitage, near Edinburgh, November 1821.

Plants minute, gregarious, of an ochry brown colour, globular and concave in the young state, and gradually becoming plane, or even somewhat convex. *Substance* thick and fleshy, not shrinking much in drying. *Margin* depressed, rounded, entire, sometimes showing a tendency to become lobed; barren or inferior surface smooth, rather rugose or puckered towards the root. *Hymenium* or upper surface appearing as if sprinkled with minute shining particles, not unlike small grains of brown sugar. *Tubular cells* containing the sporules, filiform, mixed with barren yellowish filaments. Sporules 5—8.

This an unobtrusive plant, but it is curious and interesting under the microscope, from the peculiarity of its granulated superior surface. From the situation in which I found it, it seems to love very shaded, though not damp places.

Fig. 1. *Plants, natural size.* Figs. 2. *and* 3. *Ditto, magnified.* Fig. 4. *Cells containing the sporules aud barren filaments.*

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SPHÆRIA SPERMOIDES.

Black Seed-like Sphæria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand. Grev.*—Part of FUNGI, *Juss. Hook.*

GENERIC CHARACTER.

Receptaculum 0. *Sphærulæ corneæ, liberæ, sessiles aut subimmersæ, sparsæ vel congestæ, ore interdum elongato; intùs gelatinosæ, sporulis in tubis filiformibus nidulantibus.*

Receptacle 0. Spherules free, corneous, sessile or subimmersed, scattered or crowded, the mouth sometimes elongated; interior filled with a gelatinous mass, in which are numerous filiform tubes containing sporules.

SPECIFIC CHARACTER.

SPHÆRIA spermoides; *globosa congesta, nigra, subrugosa, ostiolo minuto obsoleto, aut indistincte papillato.*

S. globose, crowded, black, opake, subrugose, with a minute obsolete, or indistinctly papilliform orifice.

SPHÆRIA spermoides, *Hoffm. Crypt. Fasc.* 2. p. 12. t. 3. f. 3.—*Pers. Syn. Fung.* p. 75.——*Alb. et Schw. Conspect. Fung.* p. 89.—*De Cand. Fl. Franç.* v. 2. p. 297.—*Ejusd. Syn.* p. 62.—*Moug. et Nest. Plant. Exs.* No. 484.—*Hook. Fl. Scot.* Pt. 2. p. 7.

SPHÆRIA aggregata, *With. Bot. Arr.* ed. 6. v. 4. p. 469.

SPHÆRIA bombardica, *Bolt. Fung.* t. 122. f. 2.—*Sow. Eng. Fung.* t. 372. f. 4.—*Purt, Midl. Fl.* v. 2. p. 711. *(not of the same author,* v. 3. p. 491. *where the true Sph. bombardica and spermoides are confused in the synonymes together).*

SPHÆRIA globularis, *Batsch, Elench. Fung.* 1. p. 271. t. 30. f. 180.—*Willd. Prodr.* 1213.—*Timm. Megapol.* 1170. *(fid. Hoffm.)*

LYCOPERDON nigrum, *Light. Fl. Scot.* v. 2. p. 1069. t. 31. *lower figure, (not of Hudson.)*

HAB. On dead stumps of trees, chiefly where deprived of their bark, and near the ground; in moist shady places the whole year; not unfrequent.

Sphærules globular, sessile, black, opake, subrugose under a common lens, scarcely at all shining, generally so crowded as to form an uninterrupted stratum, but sometimes scattered and quite distinct, particularly when growing on an uneven surface. *Mouth* frequently obsolete, sometimes indistinctly papilliform,—a character, however, which it always loses after the sporules have been discharged. *Interior* of the spherules filled with a whitish jelly, in which are a great number of filiform tubes, each containing several sporules, of an oblong form. In old age, this jelly, as it

escapes by the orifice, gives to the spherules the appearance of being tipped either with a white farinaceous powder, or with a little tendril.

It is a fortunate circumstance, that *Sphæria*, a genus at present so disproportionately large, possesses more obvious and natural characters for subdivision than *Agaricus*. Mr GRAY has arranged the British species into groups, and in some instances very happily. *Sphæria* he has limited to those plants which are destitute of a receptacle, or that horny substance in which the spherules of many species are imbedded. The spherules are also free and sessile. This genus, with an amended character, I most willingly adopt. There is, however, one important part, that in several species NEES VON ESENBECK has accurately figured, to which Mr GRAY has not paid any attention: I allude to the sporules, and the manner in which they are arranged within the spherules,—whether they are contained in filiform tubular cells, very similar to those in *Peziza*, or are naked, and formed into a mass cemented by a jelly soluble in water, as is evident in *Nœmaspora* and *Phacidium*. This character will be found to assist greatly in forming these minute plants into natural assemblages.

Fig. 1. *Sphæria spermoides, nat. size.* Fig. 2. *Spherules.* Fig. 3. *Two Spherules: one filled with the whitish jelly, the other empty.* Fig. 4. *Filiform tubes, containing the sporules. All except* Fig. 1. *more or less magnified.*

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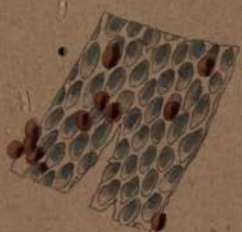

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ÆCIDIUM PINI.

Pine Æcidium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.* —EPIPHYTÆ, *Link.*—FUNGI, *De Cand. Hook.*

GENERIC CHARACTER.

Peridia in foliis vivis parasitica, teretia, membranacea, apice dehiscentia; ore plerumque dentato. Sporidia globosa minutissima, libera, pulverulenta.

Peridium (membrane enclosing the sporidia) parasitic on living leaves, smooth, membranaceous, bursting at the apex; mouth generally dentated. Sporidia (little roundish bodies containing sporules) very minute, free, and dust-like.

SPECIFIC CHARACTER.

ÆCIDIUM Pini, *sparsum, exsertum; peridio pallido-flavo oblongo-compresso* (*ore lacero*), *pulvere aurantiaco copiosissimo. Sporidiis sphæricis.*—DE CAND.

Æ. scattered, exserted; peridium pale, yellowish-orange, large, oblong, somewhat compressed, containing a great profusion of bright orange spherical sporules. Orifice irregularly torn.

ÆCIDIUM Pini, *Pers. in Gmel. Syst. Nat.* p. 1473.—*Pers. Syn. Fung.* p. 213. —*Decand. Fl. Franç.* v. 2. p. 237—*Ejusd. Syn.* p. 49.—*Alb. et Schw.* p. 120. —*Moug. et Nest. Plant. Exs.* No. 186.—*Humb. Fl. Friberg. Spec.* p. 128.

LYCOPERDON Pini, *Willd. in Bot. Mag.* B. 2. p. 16. No. 14. t. 4. f. 12.

HAB. On the leaves and even bark of the Scots Fir, *Pinus sylvestris;* in summer. Very rare. Drumshoreland Muir, near Edinburgh, 1821.

Peridium much larger than in any other of the genus; attaining the height of 2 lines when growing from the bark, and 1 line or more in diameter: when produced on the leaves it is smaller. *Substance,* membranaceous and delicate. *Sporules* most abundant, spherical or suboval, of the brightest orange colour, and escaping by an irregular lacerated orifice at the side or on the summit of the peridium.

In the summer of 1821, I was fortunate enough to find this very rare and truly beautiful plant, in company with Mr FALCONER of Carlowrie, at Drumshoreland Muir. On the Continent, it appears to be equally rare, from the small number of authors who have noticed it.

The structure of this genus well deserves examination. Most authors agree in attributing to it a true peridium, whereas LINK altogether denies its existence. It is true, that the microscope shews the beautiful membrane which encloses the sporidia, to possess a reticulated structure, dissimilar to that of other plants equally low in the scale of vegetation, although not unlike to the structure of more perfect cryptogamous plants. He has therefore placed *Æcidium* among his EPIPHYTÆ. This arrangement at first sight appears unnatural; nor can we, after an attentive view, concur with him. Whence does the large and delicate (both in structure and colour) peridium of *Æcidium Pini* proceed? It is of rapid growth, and, piercing through a portion of the strong bark, forms a complete sac, enclosing a multitude of sporidia, and apparently unconnected with the neighbouring parts: even in those species which grow on leaves, the epidermis of the leaf is ruptured, and a perfect capsular body is disclosed, differing from it in colour, and substance, and function. We cannot surely do wrong to follow so close an analogy, in regarding this membrane as a true peridium, and in confessing our ignorance respecting the cause and source of its remarkable structure.

Fig. 1. *Plants of Æ. Pini, nat. size, growing on the bark.* Fig. 2. *Ditto growing on the leaf of Pinus Sylvestris.* Fig. 3. *Magnified plants.* Fig. 4. *A section.* Fig. 5. *Sporidia; and,* Fig. 6. *A portion of the peridium, both highly magnified.*

UREDO GERANII.

Crane's-bill Uredo.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev. (not Link.)*—EPIPHYTÆ, *Link.*—Part of FUNGI, *De Cand. Hook.*

GENERIC CHARACTER.

Peridium verum nullum. Sporidia plerumque globosa non septata, nuda libera. Plantulæ "sub epidermide foliorum herbacearum ortæ et epidermide rupta, facilè dispersæ," (DE CAND.). *Epidermis peridio simillima.*

No true peridium (membrane enclosing the sporidia). Sporidia mostly globose, unilocular, naked, free, bursting through the epidermis of the leaves of herbaceous plants, and easily dispersed; epidermis bearing a strong resemblance to a true peridium.

SPECIFIC CHARACTER.

UREDO Geranii; *hypophylla, fusca, orbicularis, epidermide rupta cincta. Sporidiis globosis, interdum brevissime pedicellatis, tandem diffusis.*

U. hypophyllous, dark brown, round, girt with the ruptured epidermis; sporidia globose, sometimes with an extremely short stipes, and at length diffused.

UREDO Geranii, *De Cand. Syn. Fl. Gall* p. 47.; *Fl. Franç.* v. 6. p. 73.—*Enc. Bot.* 8. p. 225.—*Schleich, Plant. Exs.*

HAB. On the inferior surface of the leaves of various species of *Geranium*. On *G. pratense*, in Fifeshire; and on *G. pyrenaicum*, in the King's Park, Edinburgh. Summer.

Always found on the lower surface of the leaves. *Pustules* of different sizes, frequently rather large, scattered, round, and of a very dark and rich brown colour, surrounded for some time by the remains of the ruptured epidermis; but in age, the plant often loses its circular form, and becomes diffused, and very pulverulent. *Sporidia* mostly globose, chesnut-colour under the microscope; in some instances, there is a yellowish centre, surrounded by a pellucid limbus, and a few are furnished with a very minute stipes.

This plant has been discovered by continental botanists on *Geranium aconitifolium*, *G. molle* and *G. nodosum*, varying slightly in habit, according to the species on which it is parasitic. On the two species of *Geranium*, *pratense* and *pyre-*

naicum, the only ones in this country which have been found to produce it, the character is very constant; the only perceptible difference being an occasional slight tendency to become confluent when growing on the latter, and a slight ferruginous colour.

Fig. 1. *Leaf of Geranium pyrenaicum with Uredo Geranii, nat. size.* Fig. 2. *Pustules.* Fig. 3. *Sporidia,—both magnified.*

AGARICUS TURGIDUS.

Swollen-stemmed Agaric.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Juss. De Cand. Hook. Grev.*

GENERIC CHARACTER.

Pileus stipitatus aut latere affixus, subtus lamellis sporiferis rectis simplicibus. Volva nulla.

Pileus furnished with a stem, or fixed by its side, bearing on the under surface straight and simple lamellæ (gills), containing sporules. Volva (wrapper) none.

SPECIFIC CHARACTER.

AGARICUS turgidus; *pileo planiusculo demum convexo, lævissimo, cinereo-fusco; lamellis angustis, pallidis confertis. Stipite magno, valde fistuloso, ventricoso.*

Ag. pileus somewhat plane, at length convex, very smooth, greyish-brown; gills narrow, numerous, pale. Stem large, remarkably hollow, ventricose.

HAB. Dry woods, among beech and other leaves, in autumn. Foxhall, near Edinburgh.

Plants much scattered. *Pileus* 2—3½ inches in diameter, flattish in young plants, more or less convex in the old ones; of a greyish-brown colour, very smooth, feeling, a short time after gathering, like fine kid-leather, margin rounded, slightly depressed. *Flesh* very thick, extremely white, rather dense, becoming spongy and loose as it enters the stem. *Gills* very slightly decurrent, pale yellowish, numerous, narrow, irregular, but mostly 4—8 in a set. *Stem* hollow, thick swollen, 4—5 inches high, about 1 inch in diameter at the top, becoming much thicker and ventricose downwards, and again somewhat contracted at the base; white, with an uneven but not striated surface, streaked with pale pink, brown, or dirty yellow, white and downy at the base, which is very obtuse. The whole stem feels extremely hollow and elastic between the fingers. *Root* a fine dense white down, intermixed with a few minute fibres.

This very distinct Agaric I do not find described either by PERSOON, or in the new and excellent work of M. FRIES. The general form and character is too strongly marked not to be easily traced; and I have little hesitation in proposing it as

a new species. It seems to prefer very dry woods, and grows among dead leaves, particularly of the beech, some of which are usually firmly attached to its base. In decay it appears to shrivel up, unless attacked by insects. The specimens from which the accompanying drawing was made, I met with in a small wood at Foxhall, near Kirkliston, in company with the proprietor Captain WAUGH,—a gentleman who devotes much of his time to this difficult Family.

Fig. 1. *Plants, nat. size.* Fig. 2. *A section of the pileus.*

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FUSARIUM TREMELLOIDES.

Minute Fusarium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUSIDOIDEÆ, Grev.* —EPIPHYTÆ, *Link.*—Part of FUNGI, *De Cand.*

GENERIC CHARACTER.

Plantæ minutæ, subglobosæ vel oblongæ, nudæ. Sporidia fusiformia, sessilia, non septata diffusibilia.

Minute, subglobose or oblong, naked plants, composed of sessile, fusiform, free, and jointless sporidia.

SPECIFIC CHARACTER.

FUSARIUM tremelloides; *minutum, ovale, gregarium, aurantiacum, subgelatinosum. Sporidiis longe attenuatis curvulis.*

F. minute, oval, gregarious, orange, subgelatinous. Sporules long, slender, and slightly curved.

FUSARIUM tremelloides, *Grev. Fl. Edin. ined.*

TREMELLA urticæ, *Pers. Syn. Fung.* p. 628.—*De Cand. Fl. Franç.* v. 6. p. 28.

TREMELLA sepincola, *Willd. in Bot. Mag.* 4. 182.

HAB. On dead stems of the Common Nettle, *Urtica dioica;* in the spring, not rare. In the vicinity of Edinburgh it is very abundant.

This little plant rarely exceeds half a line in length, and is mostly of an oval form, varying greatly in its degree of convexity. It is always gregarious, and frequently covering the stem in such profusion, as to give it an orange or pinkish colour at some distance. In its early state it is soft and pulpy, but quickly hardens, and in old age shrinks and becomes corneous. No covering whatever appears to be present, except the artificial one of the epidermis of the stem on which it grows, and through which it makes its way. Under a high power of the microscope, the sporidia are very evident, and appear to compose nearly the whole substance, except a small part at the base; they are very slender, somewhat curved, rather long, and much attenuated at each extremity, and appear to be freely diffused through the mass, lying, however, in a radiating direction from the base towards the surface.

The only species of this genus that I can find described, are *Fusarium roseum* of LINK in the *Berlin Magazine*, and *F. lateritium* of NEES, in his meritorious *System der Pilze und*

Schwaemme. The stems of dead herbaceous plants appear to be the most favourable situation for their development. LINK found his species on *Alcea rosea;* and DE CANDOLLE observes, *On trouve sur plusieurs autres plantes des taches gélatineuses, analogues à cette tremelle, mais différentes par leur forme ou leur couleur; ce sont probablement de nouvelles espéces à ajouter au genre où l'on décidera à placer la F. de l'ortie.*

Fig. 1. *Plants, natural size.* Fig. 2. *Ditto, magnified.* Fig. 3. *A section with sporules.*

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PEZIZA PLUMBEA.

Bluish-grey Peziza.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Juss. De Cand. Hook. Link, Grev.*

GENERIC CHARACTER.

Pileus stipitatus aut sessilis, majus minusve cupuliformis vel complanatis, cellulis elongatis sporuliferis, in pagina superiore.

Pileus sessile or stipitated, dilated upwards into a variably cup-shaped or flat receptacle, having sporules contained in elongated cells, whose summits terminate on the superior surface.

SPECIFIC CHARACTER.

PEZIZA plumbea, *sessilis, minuta, gregaria, carnosa, depressa, fusco-olivacea, villosa, hymenio lævi plumbeo.*

P. sessile, minute, gregarious, fleshy, depressed, brownish-olive, villose, with a smooth bluish-grey hymenium, (fructifying surface or disk).

HAB. On rotten wood, sticks and chips, in damp woods. Autumn.

Plants minute, gregarious, depressed, rather globular when very young, concave, becoming at length plane, with a thin and slightly raised margin turning somewhat inwards. *Substance* brittle, fleshy, but not thick. Barren or inferior surface of the pileus, villous, brownish-olive. *Hymenium* or disk, bluish or grey, smooth. *Tubular cells* containing the sporules, filiform, cylindrical. *Sporules* few, indistinct.

There are few genera of Fungi, perhaps, in which a greater number of species remain to be discovered than in *Peziza*. The minute ones are scarcely to be understood by mere description, and can only be satisfactorily made known by coloured representations, few of which are as yet before the public.

Fig. 1. *Plants of Peziza plumbea, nat. size.* Fig. 2. *Ditto magnified.* Fig. 3. *Tubular cells containing the sporules,—highly magnified.*

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UREDO OBLONGATA.

Oblong Uredo.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.* —EPIPHYTÆ, *Link.*—LYCOPERDONNÆ, *Merat.*—FUNGI, *De Cand. Hook.*

GENERIC CHARACTER.

Peridium verum nullum; sporidia plerumque globosa, non septata, nuda, libera; plantulæ "sub epidermide foliorum herbacearum ortæ et epidermide rupta, facilè dispersæ," (DE CAND.) *Epidermis peridio simillima.*

No true peridium (membrane enclosing the sporidia). Sporidia mostly globose, unilocular, naked, free; bursting through the epidermis of the leaves of herbaceous plants, and easily dispersed. Epidermis resembling a peridium.

SPECIFIC CHARACTER.

UREDO oblongata; *minuta, sparsa, oblonga, fusca, epidermide longitudinaliter rupta. Sporidia globosa.*

U. minute, scattered, oblong, brown, bursting through the epidermis lengthwise. Sporules globular.

UREDO oblongata, *Link*

UREDO caricina, *De Cand. Fl. Franç.* v. 6. p. 83.—*Merat, Nouv. Fl. des Environs de Par.* v. 1. p. 98.

UREDO caricis, *(not of Pers.) Schleich, Cent. Exs.* No. 92.—*De Cand. Syn. Fl. Gall.* p. 48.—*Enc. Bot.* 8. p. 230.—*Fl. Dan.* t. 1317.

HAB. On the leaves of *Luzula maxima, Carex pendula,* and *Carex pseudo-cyperus;* generally on the superior surface. Summer. Roslin and Auchindenny woods; rather rare.

In its early state yellowish or reddish, soon changing to brown. *Form,* tolerably regular, oval or oblong; epidermis rather long in bursting, which at length it does in a longitudinal direction, giving exit to the subspherical sporules, which are by no means numerous. The pustules of this species are surrounded by a reddish or crimson spot, particularly when growing on *Luzula maxima.*

DE CANDOLLE first described this species under the name of *U. caricis,*—a name already pre-occupied by PERSOON, whose species, however, DE CANDOLLE considered a variety of *U. segetum.* Further investigation induced botanists to

continue PERSOON's plant; and DE CANDOLLE, in the Supplement to the *Flore Française*, changed the name of our plant to *U. caricina*. LINK, in the mean time, had given it to the public as *U. oblongata*, but in what work I am not at this moment able to ascertain. The name, however, is a good one, as the plant is very constant to its character, and is not confined to the genus Carex.

Fig. 1. *A portion of a leaf of Carex pendula with U. oblongata, nat. size.* Fig. 2 *Pustules, magnified.* Fig. 3. *Sporules.*

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CRYPTOSPHÆRIA TAXI.

Yew Cryptosphæria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand. Grev.*—FUNGI, *Juss. Hook.*

GENERIC CHARACTER.

Receptaculum 0. *Sphærulæ duriusculæ, sparsæ vel aggregatæ, sub epidermide insidentes, ore nunc depresso nunc elongato, erecto aut inclinato, intus massa gelatinosa sporulifera instructæ. Sporulæ semper? nudæ.*

Receptacle 0. Spherules corneous, scattered or aggregated, lying beneath the epidermis, with a depressed or elongated, erect or inclined orifice, and containing a gelatinous sporuliferous mass. Sporules always? naked.

SPECIFIC CHARACTER.

CRYPTOSPHÆRIA Taxi; *minuta, sparsa; ostiolo brevissimo non exserto. Epidermis folii convexa, centro paululum elevato et rupto. Sporulæ nudæ minutissimæ.*

C. minute, scattered; mouth very short, and not exserted. Epidermis of the leaf convex, and slightly raised and ruptured in the centre. Sporules naked, extremely minute.

CRYPTOSPHÆRIA Taxi, *Grev. Fl. Edin. ined.*

SPHÆRIA Taxi, *Sow. Eng. Fung.* t. 394. f. 6.

SPHÆRIA pinastri, *Decand. Fl. Franç.* v. 6. p. 133.

HAB. On the dead leaves of the Yew tree and of the Silver Fir, *Pinus picea;* the whole year. I have found it in the woods at Craiglockhart, and at Slateford, both near Edinburgh.

Spherules minute, scattered, round, depressed, buried in the parenchymous substance of the leaf, and, as DE CANDOLLE has correctly observed, perforating indifferently the upper or under surface; but only visible where it slightly raises and bursts the epidermis, by means of its short, thickish and obtuse mouth, which remains concealed. Sporules naked, very minute, numerous, contained in a gelatinous mass, which dries into a hard substance, but is soluble in water.

The genus *Cryptosphæria*, I have formed to include those plants of the old genus *Sphæria* which are destitute of a receptacle, and remain concealed beneath the epidermis of vegetables, which is only perforated by their mouths: they are

also farther characterized by having their spherules not enclosed in filiform tubes, as in the true *Sphæriæ*, (vid. sup. T. 6. under *Sphæria spermoides*). This genus, which comprehends many species, unites *Circinostoma* and *Exormatostoma* of Mr Gray, which, in his Natural Arrangement, have the following characters:

Circinostoma. *Thallus* 0. *Thecæ growing under the epidermis of plants, and perforating it, placed in a circle; mouths close together.*

Exormatostoma. *Thallus* 0. *Thecæ growing under the epidermis of plants, and perforating it, scattered; mouths upright.*

These genera run much into each other; yet, if the species of the former had been more constant to their character, the latter might have been retained. But in so natural a group as the *Sphæridæ*, an ill-defined genus is a serious evil. I have, therefore, for the present at least, proposed the one above mentioned as comprising a natural assemblage of plants, and, I trust, calculated to render the study less confused.

Fig. 1. *Leaves of Pinus picea with Cryptosphæria Taxi, nat. size.* Fig. 2. *A leaf magnified.* Fig. 3. *A section of a spherule; and,* Fig. 4. *Sporules, as seen separating from the hardened gelatinous mass when moistened,—both highly magnified.*

POLYPORUS HISPIDUS.

Hispid Polyporus.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Juss. De Cand. Link, Grev.*

GENERIC CHARACTER.

Hymenium cum pilei substantia homogeneum et concretum, poris subrotundis dissepimentis tenuibus simplicibus instructum.—Pileus subcarnosus vel suberosus, plerumque subsessilis, substantia fibrosa, sicca. Velum nullum.—FRIES.

Hymenium (fructifying surface) of the same substance as the pileus, not separating from it, and furnished with pores connected by thin, simple dissepiments.—Pileus subcarnose or corky, mostly subsessile, substance fibrous and dry. Veil none.

SPECIFIC CHARACTER.

POLYPORUS hispidus; *pileus dimidiatus, magnus, crassus, valde villosus, ferrugineus, demum nigricans, intùs carnoso-fibrosus, croceo-ferrugineus. Hymenium, pororum marginibus pallidis, sæpe fimbriatis.*

P. pileus dimidiate, large, thick, extremely villose, of a ferruginous colour, becoming black in age; within, fibrous and somewhat fleshy, yellow-ferruginous. Hymenium having the margin of the pores pale, and often villose or fringed.

POLYPORUS hispidus, *Fries, Syst. Mycol.* v. 1. p. 362.—*Grev. Fl. Edin. ined.*

BOLETUS hispidus, *Bull.* p. 351. t. 493. & 210.—*Pers. Syn. Fung.* p. 526.—*With. Bot. Arr.* ed. 6. v. 4. p. 397.—*Alb. et Schw. Conspect. Fung.* p. 248. *Bolton, Fung.* t. 161.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 120.—*Ejusd. Syn.* p. 24.—*Merat, Nouv. Fl. des Env. de Par.* v. 1. p. 42.—*Gray's Nat. Arr.* v. 1. p. 640.

BOLETUS spongiosus, *Light. Fl. Scot.* p. 1033.—*Hook. Fl. Scot.* Pt. 2. p. 27.

BOLETUS villosus, *Huds. Fl. Angl.* p. 626.

BOLETUS hirsutus, *Scop. ex Fries.*

BOLETUS velutinus, *Sow. Engl. Fung.* t. 345. (*not of Pers.*)—*Relh, Fl. Cantab.* ed. 3. p. 549.—*Purt, Midl. Fl.* v. 2. p. 972.; & v. 3. p. 447.

HAB. On the trunks of Ash, Oak, and Sycamore trees. Common in many parts of England, but more rare in Scotland. About Kirkliston, Captain WAUGH. On trees in the grounds of DAVID FALCONER, Esq. Carlowrie, in summer and autumn. On the Continent, in addition to those above mentioned, it has been found on Chesnut, Apple, Walnut, and Beech trees.

Pileus large, horizontal, extremely thick, 5—18 inches across, (thus equalling sometimes in diameter the tree on which it grows), of a roundish form, but frequently having an obtusely lobed appearance. Upper surface

somewhat convex, as viewed in profile, and becoming suddenly depressed towards the margin, which is rounded, and of a lighter colour: it is covered with a rough and coarse pile, which becomes almost shaggy in old age, and changes from a reddish colour to a dingy black. Substance within fibrous and coriaceous, yet soft and full of water, which may be pressed out as from a sponge; when a section is made in the direction of the fibres, a series of ferruginous lines, curved towards the margin, are very remarkable. BOLTON well observes, that "when fresh, it easily tears in slips from the centre to the margin, but cuts not without difficulty." *Hymenium* consisting of long pores, roundish or subangular, of a yellow ferruginous colour, with fringed and pale margins. The tubes at their junction with the substance of the pileus, evidently arise immediately out of it, and under the microscope are composed of the same fibrous structure. *Sporules* very minute, of a bright yellow colour, and often collected in little clusters on the surface of the hymenium.

POLYPORUS forms a truly natural genus, which is too well defined by the character I have given, nearly in the words of FRIES, to require farther elucidation. The true *Boleti*, as they at present stand, have their hymenium formed of a different substance from the tubes, which are capable of being separated from it, and mostly from each other; the stem is always central, and a veil is frequently present. They are also evanescent, compared with the *Polypori*.

Polyporus *hispidus* possesses a peculiarity in its fibrous structure, which I have not noticed to belong to other species, in the fibres of the central substance of the pileus being branched at right angles, and much thicker than those of the pores or shaggy surface. The latter is nothing more than a mass of abortive pores, as may be readily traced at the margin of the pileus. This species is of annual duration. When dry, it retains fire like *Amadou*.

The threads of a spider are almost always found attached to the under surface, and from receiving some of the falling sporules, the appearance represented in the plate is produced.

Fig. 1. *Plant, nat. size.* Fig. 2. *Pores magnified.* Fig. 3. *Dissected fibres of the tubes, which resemble those of the rest of the plant, with sporules highly magnified.*

PUCCINIA Rosæ.

Rose Puccinia.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *GASTROMYCI, Grev.* —EPIPHYTÆ, *Link.*—FUNGI, *De Cand. Hook.*

GENERIC CHARACTER.

Peridium verum 0. *Sporidia uni aut multiloculata, pedicellata, fusca vel nigra, pedicello fixa, et in cæspitulos aggregata, foliis vivis parasitici. Epidermis foliorum peridio simillima.*

True peridium 0. Sporidia one or many-celled, pedicellated, dark brown or black, fixed by the pedicel, and growing in minute clusters or tufts on living leaves. The epidermis bearing a strong resemblance to a peridium.

SPECIFIC CHARACTER.

Puccinia Rosæ, *hypophylla. Sporidia mucronata, 5—7 loculata, stipite albo filiformi basi incrassato et glandula lutea instructo.*

P. growing on the inferior surface of the leaf. Sporidia mucronated, 5—7 celled, with a white filiform stem incrassated towards the base, and furnished with a yellow gland.

Puccinia Rosæ, *De Cand. Fl. Franç.* ed. 3. v. 2. p. 218.—*Ejusd. Syn.* p. 44. —*Merat, Nouv. Fl. des Env. de Paris,* v. 1. p. 104.—*Moug. et Nest. Plant. Exs.* No. 293.—*Purt, Midl. Fl.* v. 3. p. 301. t. 28.—*Grev. Fl. Edin. ined.* —*Gray's Nat. Arr.* v. 1. p. 543.

Puccinia mucronata, α Rosæ, *Pers. Syn. Fung.* p. 230.—*Tent.* p. 38. t. 3.— —*Alb. et Schw.* p. 134.—*Hedw. f. Fung. ined.* t. 4.—*Fl. Dan.* t. 1369.— *Hook. Fl. Scot.* Pt. 2. 17.—*Nees, Syst.* t. 1. f. 14.

Uredo mucronata, *Strauss, in Annal. Soc. Wetterav.* 2. p. 109.

Ascophora disciflora, *Tode, Meckl. Fung.* t. 3. f. 26.

Hab. On the leaves of various *Rosæ,* particularly *R. canina, R. alba,* and *R. centifolia.* Very abundant in autumn, in fields and gardens.

Tufts scattered, black, lax, very unequal in size. *Sporidia* under the microscope reddish-brown, mucronate, 5—7 celled, smooth, of an oblongo-cylindrical form, and furnished with a white filiform stem, incrassated for at least the lower half of its whole length; at the base of the incrassated portion is a yellow gland, below which the stem terminates in a very short process.

The present species is among the earliest of those noticed by botanists. Tode, who described our plant as an *Ascophora,*

published a figure of it, which is perhaps the least accurate of any in his collection. Subsequently, though a great number of species have been described, good representations are still wanting; unless, indeed, the unpublished figures of the late HEDWIG (the son), which I have not seen, are deserving of that name.

Mr GRAY, retains under *Puccinia*, only those species which have their sporidia divided into many cells; the plant for which MICHELI at first constituted the genus being also, but judiciously removed by DE CANDOLLE. PERSOON, in his *Traité sur les Champignons comestibles*, seems to consider such an arrangement necessary; and alludes to a new genus formed to receive *Puccinia graminis*, *Rosæ*, *Rubi*, *Potentillæ*, &c. called *Aregma*, but does not name the author. I cannot myself perceive the propriety of this division, especially as there are species so intermediate, that much uncertainty and want of precision would be the inevitable result; than which nothing can be more discouraging to the student of so intricate a family. Mr GRAY has even constituted a genus of those *Puccinia* which have two cells, and raised *Cæomurus*, one of LINK's sections of *Cæoma* to the same rank, from possessing only one cell.

Puccinia Rosæ is very frequently accompanied by *Uredo miniata*; insomuch that it has been described as a parasite upon the latter: it is, however, often found without it. In *Flora Danica* the *Uredo* is figured intermixed with the *Puccinia*.

Fig. 1. *A leaflet of Rosa centifolia, with Puccinia Rosæ, nat. size.* Fig. 2. *The Puccinia magnified.* Fig. 3. *Sporidia highly magnified.*

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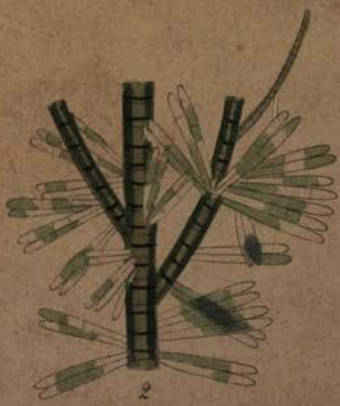

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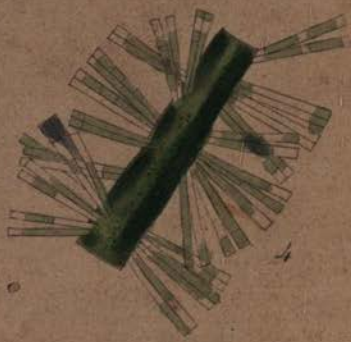

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ECHINELLA FASCICULATA.

Linear Echinella.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *CHÆTOPHOROIDEÆ, Grev.*—*ALGÆ, Juss. De Cand.*

GENERIC CHARACTER.

Corpuscula minuta, subgelatinosa, sparsa, vel in massa densa congesta, sessilia vel stipitata, subhyalina, granulis coloratis internis.

Minute, subgelatinous bodies, scattered, or crowded into a dense mass, sessile or stipitate, subhyaline, and containing coloured granules.

SPECIFIC CHARACTER.

ECHINELLA fasciculata; *corpuscula sessilia, æqualia, stricta, rigida, continua, fastigiata, subradiata, granulis luteo-viridis; in Algis filiformibus parasitica.*

E. minute bodies, sessile, equal, straight, continuous, fastigiate and subradiating; parasitic on the filiform algæ.

ECHINELLA fasciculata, *Lyng. Tent. Hydrophyt. Dan.* p. 210. t. 70. A.—*Grev. Fl. Edin. ined.*

DIATOMA fasciculata, *Ag. Disp.* p. 35.—*Syn.* p. 120.

FL. DAN. t. 945. *(quoad pilos qui in conferva pennatula,* i. e. *conferva flavescenti adsunt),* Lyngb.

β truncata, *aqua dulcis.*

HAB. On the filiform and capillary Algæ, plentiful; particularly on *Ectocarpus littoralis,* (*Conferva littoralis* of Eng. Bot.) Common in the Frith of Forth. β, in fresh water, attached to *confervæ,* stems of grass, the *Lemnæ,* &c. Ditches near Edinburgh. Both are found at all seasons.

Excessively minute, invisible to the naked eye, but giving a downy or dirty appearance to the Algæ on which it grows; under the microscope very distinctly composed of simple, sessile, and filiform bodies, slightly rounded and attenuated at each extremity; very short, straight, rigid, continuous, equal in diameter and in length, partly diaphanous, and partly filled with a mass of greenish-yellow granules, 2—8 growing together from the same point, in a fasciculated and radiating manner.

β resembles the other in all respects, except in being perfectly truncate, not attenuated at either extremity, and growing in fresh water.

This belongs to a most curious genus of aquatic plants, the claim of which to a place in the vegetable kingdom has been doubted by some, who are willing to assign it a station in

the animal kingdom. Ten or eleven species have been discovered, nearly half of which have been detected in this country by Mr ARNOTT and myself. After long examination in all states, I cannot but incline to believe them true plants. Their excessive minuteness, however, will, from the difficulty of ascertaintaining their structure, render their situation in a *Systema Naturæ* to many very uncertain; and it must be confessed they are more unintelligible than some of those plants which, according to AGARDH, undergo very marvellous transformations: take, for example, *Oscillatoria flexuosa*, in his *Icones Algarum ineditæ*, fasc. 1. t. 10. where the *animalcula* into which the filaments are changed (mutantur) are absolutely figured!

AGARDH retains *E. fasciculata* among the *Diatomæ*, and imagines the peculiar character to be produced by the separation of the joints; but LYNGBYE is of a different opinion, nor have I been able to trace in the slightest degree the existence of any articulations, nor indeed any other state of the plant different from that represented in the plate.

Fig. 1. and 2. *Echinella fasciculata on Ectocarpus littoralis*, (*Conferva littoralis*, Auct.) Fig. 3. *on Conferva rupestris.* Fig. 4. *β, on Vaucheria Dillwynii.—All more or less magnified.*

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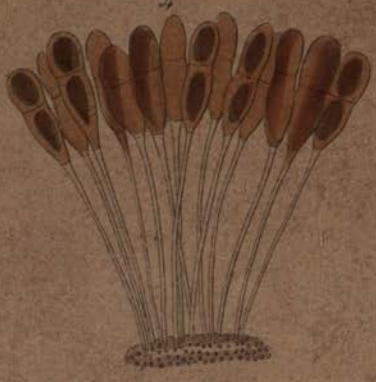
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PUCCINIA Buxi.

Box-leaf Puccinia.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *GASTROMYCI, Grev.* —EPIPHYTÆ, *Link.*—FUNGI, *De Cand.*

GENERIC CHARACTER.

Peridium verum 0. *Sporidia uni aut multiloculata, pedicellata, pedicello fixa, et in cæspitulis aggregata, foliis vivis parasiticis. Epidermis foliorum peridio simillima.*

True peridium 0. Sporidia, one or many-celled, pedicellated, fixed by the pedicel, and growing in minute clusters or tufts on living leaves. The epidermis bearing a strong resemblance to a peridium.

SPECIFIC CHARACTER.

Puccinia Buxi; *sparsa, rufo-fusca, orbicularis, valde convexa, epidermide rupta cincta. Sporidia oblonga biloculata lutea, stipite longo, filiformi.*

P. scattered, reddish-brown, round, very convex, surrounded by the ruptured epidermis. Sporidia oblong, 2-celled, yellow, with a long filiform stem.

Puccinia Buxi, *De Cand. Fl. Franç.* v. 6. p. 60.—*Sow. Engl. Fungi*, t. 439.—*—Merat, Nouv. Fl. des Env. de Paris*, v. 1. p. 104.—*Moug. et Nest. Plant. Exs.* v. 7. No. 676.

Dicæoma buxi, *Gray's Nat. Arr.* v. 1. p. 543.

Hab. On both sides of the leaves of the common Box, *Buxus sempervirens.* Arlary, near Kinross, Mr Arnott. Boxhill, Mr J. D. Sowerby.

A very handsome little parasite, of a rich purplish or reddish-brown colour, bursting through, and always surrounded by a portion of the epidermis; not unfrequently the latter is ruptured in a circular manner, leaving the centre still attached, which gives the mature plant a remarkable umbilicated appearance, as represented at Fig. 3. magnified. *Form* very regular, round and prominent. *Sporidia* numerous, densely crowded, of an oblong shape, composed of two brownish-yellow cells, which, according to De Candolle, are divided by a true articulation, and easily separate. The upper cell is roundish, the lower one attenuated, and terminating in a long filiform white stem.

A very conspicuous plant, from the great contrast between its rich dark colour and the bright green of the box-leaves on

which it grows; nevertheless it has not been found in Scotland except by my friend G. A. W. Arnott, Esq.

In some instances it seems to pierce through the leaf, and to form corresponding tufts on each surface.

Fig. 1. *Puccinia Buxi, on Buxus sempervirens, nat. size.* Fig. 2. and 3. *Ditto, magnified.* Fig. 4. *Sporidia, with masses of inclosed sporules.*

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AMANITA NIVALIS.

Alpine Amanita.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Juss. De Cand.* &c.

GENERIC CHARACTER.

Pileus stipitatus volvatus, subtus lamellis sporiferis rectis instructus. Stipes annulatus aut nudus.

Cap furnished with a stem and volva (general covering from which the plant bursts in an early stage as from an egg), and bearing on its inferior surface straight, sporule-bearing lamellæ (gills). Stem furnished with a ring-like veil, or naked.

SPECIFIC CHARACTER.

AMANITA nivalis; *tota alba. Pileus planus vel subumbonatus, centro sæpe diluto-ochraceo, margine striato-pectinato. Lamellis subdistantibus. Stipite nudo, bulboso. Volva laxa.*

A. whole plant white. Cap plane, or slightly umbonate, the centre often pale-ochraceous, margin striato-pectinate. Lamellæ (gills) somewhat distant. Stem naked, bulbous. Volva lax.

HAB. On the summits of the highest mountains in the Grampian range; as Brae Riach, Ben-ne-Bourd, Cairngorm, &c.

Plant wholly white, egg-shaped before the bursting of the volva. *Pileus* 2—3 inches broad, convex at first, gradually becoming plane, furnished in some specimens with a slight umbo (*boss* of Withering), often somewhat ochraceous in the centre, warty immediately after bursting from the volva, afterwards quite smooth. Margin thin, striato-pectinate. *Flesh* white, very thin at the margin. *Gills* somewhat distant, irregular, very narrow where they are adnate with the stem, but rather ventricose towards the margin of the pileus, edges entire. *Stem* 3—5 inches high, 3—4 lines thick, naked, equal, dilating within the volva, and containing a mass of spongy fibres, completely filling up the centre. *Volva* loose, flaccid, persistent. *Root* bulbous, but not of greater diameter than the volva, between it and which, there is a slight contraction.

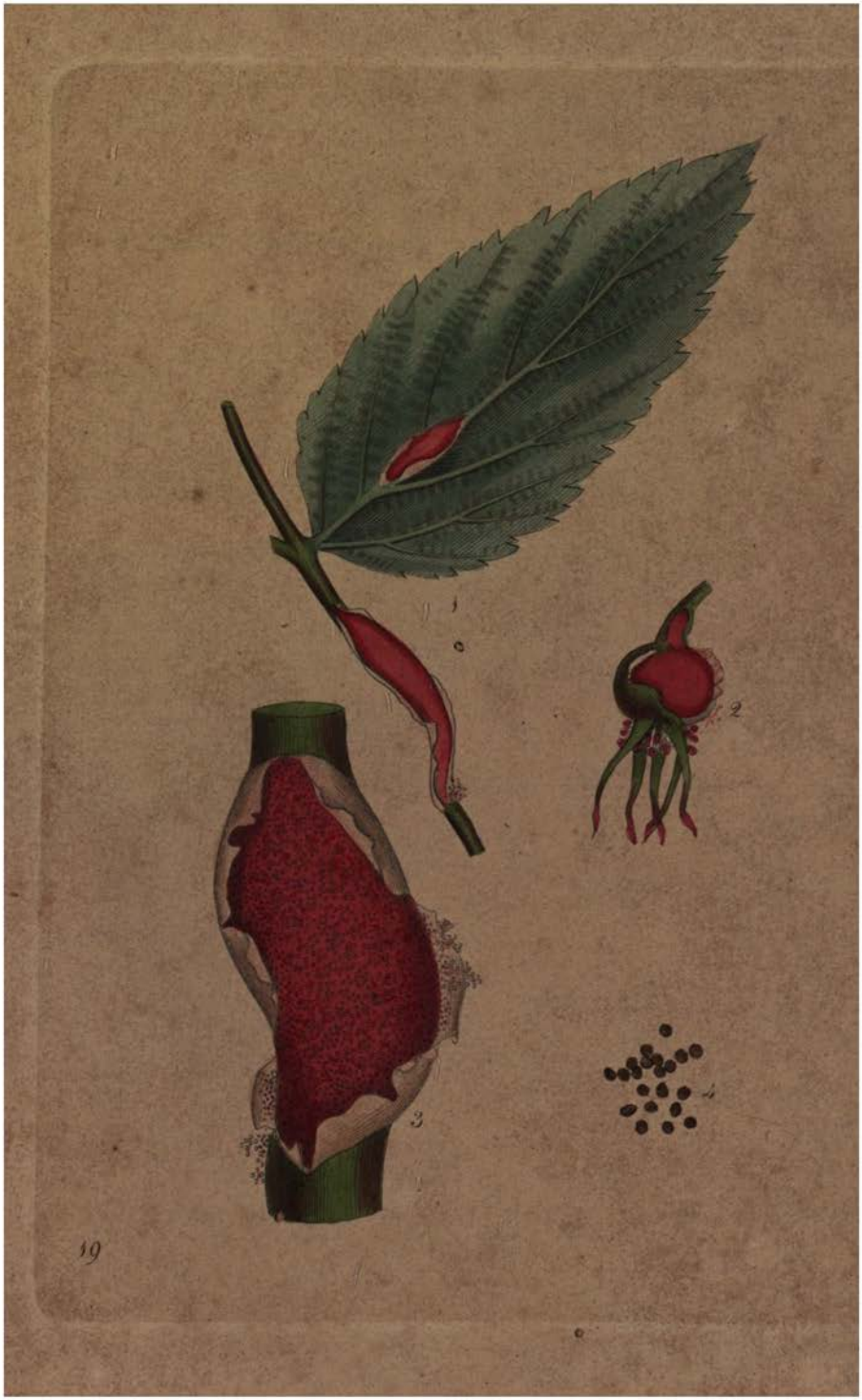
This elegant, and in appearance delicate, *Amanita*, is the most alpine species of fungus I am acquainted with. It grows on the bleak summits of the loftiest Grampians, and really en-

livens the few turfy spots which occur in those desert regions, by its symmetry and extreme whiteness. In its young state, it is completely enveloped in the smooth wrapper *(volva)*, and bearing a near resemblance to a pigeon's egg, scarcely rises above the dark moss. After bursting from its confinement, it rapidly advances to maturity, uninjured by the coldest winds, or the snow with which it is sometimes covered, even in the middle of August.

This rare fungus was gathered in August 1822, in an excursion made with a view to extend the botany of Scotland, by Dr HOOKER, Mr ARNOTT, and myself. *Luzula arcuata*, (*Juncus arcuatus* of WAHLENBERG), an interesting plant, new to the British Flora, discovered in the same locality, and in the same excursion, will speedily be given to the public by Dr HOOKER, in that truly splendid and national work the Flora Londinensis.

It is rather surprising that FRIES should have united so distinct a genus as *Amanita* to *Agaricus*, already overwhelmed by sections, divisions and subdivisions, and containing above 800 species!

Fig. 1. *Amanita nivalis.* Fig. 2. *Young plant, soon after bursting the volva.* Fig. 3. *Section of a mature plant.* Fig. 4. *Young plant, with the volva entire.* Fig. 5. *Section of ditto.*——*All natural size.*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UREDO EFFUSA.

Large orange Uredo.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.* —EPIPHYTÆ, *Link.*——FUNGI, *Juss. De Cand. Hook.*

GENERIC CHARACTER.

Peridium verum 0. *Sporidia plerumque globosa non septata, nuda, libera. Plantulæ " sub epidermide foliorum herbacearum ortæ et epidermide rupta, facilè dispersæ"* (DE CAND.). *Epidermis peridio simillima.*

No true peridium (membrane enclosing the sporidia). Sporidia mostly globose, unilocular, naked, free, bursting through the epidermis of the leaves of herbaceous plants, and easily dispersed; epidermis, bearing a strong resemblance to a true peridium.

SPECIFIC CHARACTER.

UREDO effusa; *miniato-aurantia, lata, pulverulenta, nunc hypophylla in nervis petiolisque spirææ ulmariæ, nunc etiam ad calyces rosarum. Sporidia numerosa subrotunda.*

U. bright reddish-orange, broad, pulverulent, hypophyllous on the nerves and petiols of *Spiræa ulmaria*, or even on the calyx of various roses. Sporules numerous subglobose.

UREDO effusa, *Strauss, in Annal. Soc. Wetterav.* 2. p. 91. α & β.—*Grev. Fl. Edin. ined.*

UREDO pingues, *De Cand. Fl. Franç.* v. 2. p. 235.—*Syn.* p. 49.

UREDO miniata α? *Pers. Syn. Fung.* p. 216.—*Alb. et Schw.* p. var. γγ. p. 123.

UREDO spirææ, *Sow. Eng. Fung.* t. 398.

UREDO Rosæ β, *De Cand. Fl. Franç.* v. 2. p. 232.

UREDO aurea, *Purt, Midl. Fl.* v. 2. p. 725.

HAB. On the petiols and veins of the under surface of the leaves of *Spiræa ulmaria*. Petiols, veins, flower-stalk, and even calyx of various roses; especially *Rosa spinosissima, R. tomentosa*, and *R. rubiginosa*. Found in England by Mr SOWERBY and THOMAS PURTON, Esq. Balmuto, Miss E. and Miss M. BOSWELL. Plentiful near Edinburgh. Autumn.

Very conspicuous, from its large size, and vivid orange colour. Distorting the veins and petiols, irregular in form, and spreading over a large surface, particularly when it attacks the seed-vessel of the Roses. Very pulverulent, staining the fingers when touched. Surrounded by the remains of the ruptured epidermis, which is of a pale colour. Sporules numerous, subglobose, reddish-brown under the microscope, pale when dried.

Considerable confusion appears to exist among some of the orange *Uredines* parasitic on the ROSACEÆ, particularly between *U. miniata* and *pingues*. PERSOON brought two distinct species together under the former, which is not surprising, if we consider how little was known of these minute plants when his *Synopsis* was published. His variety α I think certainly belongs to our species, as well as DE CANDOLLE's *U. Rosæ* β; his var. α being what is usually taken for *U. miniata*, and is extremely common on the leaves of *Rosa centifolia* in gardens. The many names under which our plant has been described, has induced me to adopt the very characteristic one given by STRAUSS, in *Annalen der Wetterauischen Gesellschaft*, which, as it is now accompanied by the first figure published of the species, will, I hope, be sufficient to prevent any future confusion. I am not aware of any other species of orange *Uredo* that attacks the veins, petiols and calyces of the roses, or of *Spiræa Ulmaria*; nor is the present species generally found on any other parts, though certainly not confined to them.

It is probably extremely common, especially where *Rosa spinosissima* is found in abundance. I have gathered it every where around Edinburgh, and have received it along with a great number of new and interesting plants of the same Order, from my highly gifted and valued friends Miss E. and Miss M. BOSWELL of Balmuto.

Fig. 1. *Uredo effusa on Spiræa ulmaria.* Fig. 2. *On the seed-vessel of Rosa spinosissima, nat. size.* Fig. 3. *Ditto magnified.* Fig. 4. *Sporidia.*

NÆMASPORA Rosarum.

Rose Nemaspora.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand. Grev.*—FUNGI, *Juss. Hook.*

GENERIC CHARACTER.

Massa sporulifera gelatinosa, in forma cyrrhorum, ex sphærulis immersis, manifestis aut obsoletis, erumpens. Cyrrhi in aqua solubilis. Sporulæ minutæ.

A gelatinous sporuliferous mass, bursting from immersed, obvious, or indistinct spherules, in the form of tendrils. Tendrils (*cyrrhi*) soluble in water. Sporules minute.

SPECIFIC CHARACTER.

NÆMASPORA Rosarum: *Cyrrhus sporuliferus albidus, simplex. Sphærulæ sectione horizontale sinuatæ, sub epidermide manifestæ, ore nigro margine tomentoso albo.*

N. sporuliferous tendril, white, simple. Spherules waved; when divided horizontally, manifest under the epidermis; mouth blackish, and furnished with a tomentose or cottony margin.

NÆMASPORA Rosarum, *Grev. Fl. Edin. ined.*

HAB. On the smaller branches of dead rose trees; chiefly *Rosa canina*. Autumn. Edinburgh.

Minute, slightly prominent, gregarious. *Spherules* under the epidermis distinct, soft, blackish-brown, the margin appearing much waved in a horizontal section. Orifice black in the centre, with a whitish cottony margin. *Sporuliferous mass* escaping in the form of a simple, minute, filiform, whitish tendril, which is sometimes short, and merely curved.

It is to be feared that *Nœmaspora* may be found eventually to border too closely upon many species of the old genus *Sphæria;* some of which have a tendency to discharge their sporules in the form of tendrils. Until, however, the relation which the individuals of so extensive a family bear to each other can be established, *Nœmaspora* must remain as it is. The spherules certainly do not appear to be so regular in their form as in the *Sphæriæ* in general, and to be also of a much less corneous nature. At present, there are but few species

described, most of which are more striking, and far more highly cirrhose than *Nœmaspora Rosarum*.

Fig. 1. *Nœmaspora Rosarum, nat. size.* Fig. 2. *Two spherules.* Fig. 3. *A transverse section.* Fig. 4. *A perpendicular section.* Fig. 5. *A tendril, with one extremity moistened, and setting the minute sporules at liberty.*— Figs. 2, 3, 4, & 5. *more or less magnified.*

21

ERINEUM BETULÆ.

Crimson Erineum.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.* —MUCEDINES, *Link.*—FUNGI, *Juss. De Cand. Hook.*

GENERIC CHARACTER.

Planta epiphylla, depressa, subgrumosa vel sericea, vel filamentosa, ex tubis cylindricis vel compressis, clavatis aut turbinatis, in cæspitulis latis congestis, composita.

Plant epiphyllous, depressed, subgrumose, velvety, or filamentous, composed of cylindrical or compressed, club-shaped or turbinate tubes, collected into broad tufts.

SPECIFIC CHARACTER.

ERINEUM Betulæ; *epiphyllum, inæqualiter effusum, sanguineum, tubis multiformibus, turbinatis, clavatis vel capitatis, apicibus sæpe truncatis.*

E. epiphyllous, unequally effused, fine crimson; tubes variable turbinate, clavate, or capitate, with the apex often truncated.

ERINEUM Betulæ, *De Cand. Syn. Fl. Gall.* p. 15.—*Fl. Franç.* v. 6. p. 14.—*Schleich, Cent. Exs.* 94. (fide De Cand.)—*Grev. in Edin. Phil. Journ.* v. 6. p. 77. t. 3. f. 1.—*Fl. Edin. ined.*

ERINEUM betulinum, *Alb. et Schw. Conspect. Fung.* (*excl. char.* "rufo-fuscum") p. 370.—*Pers. Mycol. Europ.* sect. 1. p. 6.

ERINEUM purpureum? *De Cand. Encyc. Bot.* v. 8. p. 218.—*Fl. Franç.* v. 6. p. 15.

HAB. On the superior surface of the leaves of the common Birch (*Betula alba*); rarely on the inferior surface. Balmuto, Miss E. and M. BOSWELL. Not uncommon in shady places, as Roslin and Auchindenny Woods, Ravelrig-toll Moss, &c. Spring and summer.

Deep crimson, in the mature state, rather pale when young; very irregular in form, effused or confluent, sometimes covering nearly the whole leaf in one uninterrupted mass, at others merely scattered or sprinkled over the surface, appearing as if it had been dashed on by accident. In old age, the colour becomes somewhat faded and dingy. *Tubes* (*sporidia*) of so irregular a form, as to appear, under a pocket-magnifier, like a mass of granules; under a higher power they are found to be chiefly capitate, many however, being club-shaped, somewhat turbinate, or even what may be termed hammer-shaped. Under the highest power, they retain more or less of a pink colour.

This very beautiful *Erineum* has been by many authors confounded with *E. betulinum* of REBENTISCH. ALBERTINI

and SCHWEINIZ, in their admirable *Conspectus Fungorum*, seem to have given rise to this confusion, which has been farther increased by DE CANDOLLE in the *Flore Française*, under *E. purpureum*, although that author has, in the same work, very correctly described it under the name of *Betulæ*. PERSOON, in his new *Mycologia Europæa*, a work of great merit, but very deficient in synonymes and microscopical investigation, has again united the two under *E. betulinum*, although, in a subsequent observation, he says that it grows chiefly on the superior surface, particularly if it is of a red colour. To clear up the matter, he has not given us a single reference, except the general one of *E. betulinum, roseum*, and *purpureum* of authors.

In the *Edinburgh Philosophical Journal*, I have observed, that *E. Betulæ* is almost invariably found of a deep purple colour, and very irregular in form, sometimes nearly covering the leaf, at others merely scattered over it. The colour becomes dingy in age, but does not entirely lose its character. Viewed with a pocket-magnifier, it appears not filamentous, but finely granulated.

Erineum betulinum, on the contrary, is more defined, and chiefly on, though not confined to, the lower surface. The colour changes from white to a ferruginous or dark tobacco colour. The tubes have some resemblance in their form, but are smaller, and more excentric. The whole plant, also, is never so confluent as the other, and is generally more or less sunk in a swollen portion of the leaf.

Fig. 1. *Erineum Betulæ.* Fig. 2. *The same, somewhat magnified.* Fig. 3. *The tubes or sporidia, highly magnified.*

22

2

ERINEUM PYRINUM.

Apple-leaf Erineum.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.* —MUCEDINES, *Link.*—FUNGI, *Juss. De Cand.*

GENERIC CHARACTER.

Planta epiphylla, depressa, subgrumosa vel sericea, vel filamentosa, ex tubis cylindricis vel compressis, clavatis aut turbinatis, in cæspitulis latis congestis, composita.

Plant epiphyllous, depressed, subgrumose, velvety, or filamentous, composed of cylindrical or compressed, club-shaped or turbinate tubes, collected into broad tufts.

SPECIFIC CHARACTER.

ERINEUM pyrinum; *hypophyllum sparsum vel subeffusum, spadiceum, tubis compressis, linearibus, sublaxis, apicibus clavatis sæpe truncatis.*

E. hypophyllous, scattered or subeffused, rich reddish-brown. Tubes compressed, linear, somewhat lax, with the apex club-shaped, and often truncate.

ERINEUM pyrinum, *Pers. Tent. Disp. Fung.* p. 43. t. 4. f. 1. (malè.)—*Syn. Fung.* p. 700.—*Alb. et Schw. Conspect. Fung.* p. 370.—*Purt. Midl. Fl.* v. 3. p. 15.—*Pers. Mycol. Europ.* sect. 1. p. 4.—*Grev. Fl. Edin. ined.*

HAB. On the leaves of the Common Crab and Wild Pear, (*Pyrus malus et communis*). Between Bridgenorth and Faintree, Salop, THOMAS PURTON, Esq. Craigie Hill, near Edinburgh, Miss ANNA WAUCH. Orchard at Meavy Parsonage in Devonshire, the Rev. J. S. TOZER. Summer and autumn.

White in its young state, gradually changing to a very rich reddish-brown; scattered in an irregular manner over the leaf, in tufts or spots of no precise form; sometimes becoming partially confluent. Tubes lax, entangled, rather long, linear, compressed, club-shaped, and cylindrical at the apex, frequently truncate, and of a deeper colour, as viewed under the microscope.

For this handsome and rich species, which is of considerable rarity, I am indebted to the kindness of Miss ANNA WAUCH, who, in company with her brother Captain WAUCH, discovered it for the first time in Scotland on Craigie Hill. Soon afterwards, I received it from my friend the Reverend J. S.

TOZER, who has, within a short period, detected it in more than one place in Devonshire. It is still a rare species, and has not, to my knowledge, been met with in Great Britain, by any other individual, except THOMAS PURTON, Esq. the well-known author of the *Midland Flora*.

Fig. 1. *Erineum pyrinum, on Pyrus malus.* Fig. 2. *Tubes or sporidia magnified.*

AGARICUS TUBEROSUS.

Tuberous Agaric.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Juss. De Cand.* &c.

DIV. LEUCOSPORUS COLLYBIA, *Fries.*—SECT. III. GYMNOPUS, *Pers.*

GENERIC CHARACTER.

Pileus stipitatus aut latere affixus, subtus lamellis sporiferis rectis simplicibus. Volva nulla.

Pileus furnished with a stem, or fixed by its side, bearing, on the under surface, straight and simple lamellæ (gills), containing sporules. Volva (wrapper) none.

SPECIFIC CHARACTER.

AGARICUS tuberosus; *albus, parvus, pileo plano vel subumbonato, lamellis adnatis, confertis, stipite subsolido, inferne subtomentoso, tuberibus innato.*

Ag. white, small, pileus plane, or somewhat umbonate; gills adnate with the stem, crowded; stem subsolid, somewhat tomentose at the base, and springing from a tuberous root.

AGARICUS tuberosus, *Bull.* t. 256.—*Pers. Syn.* p. 374.—*Alb. et Schw. Conspect. Fung.* p. 190.—*De Cand. Fl. Franç.* v. 2. p. 178.—*Ejusd. Syn.* p. 36.—*Fries, Obs.* v. 1. p. 38.—*Fl. Dan.* t. 1613.—*Fries, Syst. Mycol.* v. 1. p. 133.—*Grev. Fl. Edin. ined.*

AGARICUS amanitæ, *Batsch. Elench. Fung. Cont.* 1. p. 109. f. 93.—*Pers. Obs. Mycol.* pars 2. p. 52.

AGARICUS alumnus, *Bolt. Fung.* t. 155.

AGARICUS bulbosus, *Schum.* p. 307.

AGARICUS albus, var. 2. *With. Bot. Arr.* ed. 6. v. 4. p. 274.

GYMNOPUS tuberosus, *Gray's Nat. Arr.* v. 1. p. 211.

HAB. In woods, on several of the larger Agarics, when completely black and decayed; also on the ground, among moss and dead leaves. Woods at Balmuto, in company with Miss MARIANNE BOSWELL. September.

Plant gregarious. *Pileus* $\frac{1}{4}$–$\frac{3}{4}$ of an inch in breadth, slightly convex, at length plane, smooth, white or brownish-white, margin extremely thin, even, or somewhat waved. *Gills* numerous, adnate with the stem, white, narrow, irregular. *Flesh* none, except in the centre. *Stem* $\frac{1}{2}$–2 inches high, very slender, subfistulose, smooth, whitish or reddish, more or less flexuose, downy at the base, and attached to a tuber of a brown or chesnut colour, supposed by some authors to be a distinct plant of the genus *Sclerotium*. A few long white fibres spring from the stem at its union with the tuber.

This is a very curious plant, and has given rise to much uncertainty respecting its extraordinary root. Until PERSOON published his *Synopsis Fungorum*, authors had supposed this tuberous root to be really a part of the plant; but PERSOON considered it as another plant, and called it *Sclerotium fungorum*. Subsequent writers do not seem to have made up their minds on the subject, generally contenting themselves with quoting PERSOON's observations. DE CANDOLLE, in a memoir on the genus *Sclerotium*, in the *Mémoires du Muséum d'Histoire Naturelle*, v. ii. p. 401., describes the tuber as a true *Sclerotium*. Lastly, FRIES, in his *Systema Mycologicum*, affirms the stem of the agaric to terminate in *Sclerotium cornutum*, (*S. fungorum* of PERSOON).

I have examined the root of this curious agaric with great attention, and am rather inclined to believe it a part of the plant. In every specimen I have seen, the agaric invariably rises from the smallest extremity of the tuber, never from the side; and under the microscope, I have traced a continuation of the substance of the stem into the tuber, as perfectly as my dissecting instruments would allow me to do. Besides, I am not aware that the tuber has ever been found without the agaric, or at least traces of its having been attached to one. BULLIARD has a figure of one tuber giving rise to several stems, which, if correct, rather strengthens the idea of its not being a distinct substance; and DE CANDOLLE, in the 2d volume of the *Flore Française*, p. 178., gives so minute a detail of the growth of the tuber, from the size of a *petite graine ou tubercle*, to its full dimensions, along with the agaric, in the form of a *filet menu, blanc, et surmonté d'une petite tête*, that it is difficult to conceive how two different plants should so constantly be found together, and invariably attached in the same manner, *i. e.* at the projecting points or extremities only.

Agaricus alumnus of BOLTON I have little doubt belongs to our present species, though he says it wants the tuber: this may easily be conceived to have been detached in gathering it.

Fig. 1. *Plants of Agaricus tuberosus.* Fig. 2. *A section.*

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HYSTERIUM Rubi.

Bramble-stem Hysterium.

Class and Order CRYPTGAMIA FUNGI, *Linn.*—Nat. Ord. *HYPOXYLA*, *De Cand.* *Grev.*—FUNGI, *Juss. Hook.*

GENERIC CHARACTER.

Receptaculum oblongum, rima longitudinali dehiscens. Sporulæ in cellulis elongatis gelatinosis. Crusta nulla.

Receptacle oblong, bursting by a longitudinal slit. Sporules in elongated gelatinous cells. Crust none.

SPECIFIC CHARACTER.

Hysterium Rubi; *ellipticum vel oblongum, utrinque attenuatum, nigrum, subnitidum, obsoletè striatum, cellulis sporuliferis apicibus rotundo-clavatis.*

H. elliptical or oblong, attenuated at each end, black, somewhat shining, obscurely striated, the summits of the sporuliferous cells obtusely club-shaped.

Hysterium Rubi, *Pers. Obs. Mycol.* pars 1. p. 84.—*Syn. Fung.* p. 100.—*Alb. et Schw. Conspect. Fung.* p. 56.—*Moug. et Nest. Pl. Exs.* No. 564.

Hypoderma virgultorum, *De Cand. Fl. Franç.* v. 6. p. 165.

Hab. On the stems of various species of *Rubus*, particularly *R. cæsius* and *fruticulosus*. Woods on the banks of Loch Lomond, near Tarbet. Rare about Edinburgh.

Elliptical, oblong, or even linear, somewhat flexuose, attenuated at each extremity, black, slightly shining, obscurely striated, opening freely from one end to the other. The gelatinous mass of sporuliferous cells very obvious to the naked eye, of a grey colour. Cells elongated, diaphanous, numerous, very slender, terminating in a rounded club-shaped summit. Sporules yellowish, 3–5 in each cell.

This is one of our most beautiful *Hysteria*, and comparatively rare. The pulpy mass of sporuliferous cells is distinctly visible to the naked eye, in damp weather, at which time the black corneous receptacle is open.

The celebrated De Candolle has, in his *Flore Française*, constituted a genus of these plants, under the name of *Hypoderma*; the generic difference residing only in *Hypoderma* discharging its sporuliferous pulp in an obvious manner,

and in bursting through the epidermis of vegetables. *Hysterium* either does not discharge its pulp at all, or very obscurely, and grows upon the bark of trees, but altogether destitute of crust like *Opegrapha*. The above being the sole difference, and as the plants resemble each other most closely in all the more important points, I do not think it necessary to keep them separate, as it would only tend to confuse the student. Having drawn and dissected almost the whole of the species in both genera, I am enabled to decide, from actual investigation; and it may be observed, that, in several species of *Hypoderma*, particularly *H. pinastri*, *Graminum*, and *Juniperi* (GREV.) the epidermis does not appear to be ruptured, but the receptacle to be formed out of the substance of the vegetable itself on which it grows; or at least, so intimate a union to be formed as to deceive the observer.

Fig. 1. *Hysterium Rubi.* Fig. 2. *A receptacle.* Fig. 3. *A receptacle open.* Fig. 4. *Sporuliferous cells.*—Fig. 2, 3, & 4. *more or less magnified.*

25

ECHINELLA PARADOXA.

Golden Echinella.

CLASS AND ORDER CRYPOGAMIA ALGÆ, *Linn.*—NAT. ORD. *CHÆTOPHOROIDEÆ, Grev.*—ALGÆ, *Juss. De Cand.*

GENERIC CHARACTER.

Corpuscula minuta, subgelatinosa, sparsa, vel in massa densa congesta, sessilia vel stipitata, subhyalina, granulis coloratis internis.

Minute gelatinous bodies, scattered or crowded into a dense mass, sessile or stipitate, subhyaline, and containing coloured granules.

SPECIFIC CHARACTER.

ECHINELLA paradoxa; *filis aggregatis, continuis, rigidis, tenuissimis, ramosis, apicibus dilatatis subbinatimque cuneiformibus,* (Lyngb.)

E. threads crowded, even, rigid, very slender, branched, summits dilated, wedge-shaped, subbinate.

ECHINELLA paradoxa, *Lyng. Tent. Hydroph. Dan.* p. 211. t. 70.—*Grev. Fl. Edin. ined.*

HAB. On various marine plants, as the filiform *Ulvæ*, many *Hutchinsiæ*, &c. in small pools left by the sea. Near Kirkcaldy in May 1820. Black Rocks at Leith, and opposite Caroline Park, abundantly, in company with Mr WALKER ARNOTT, March 1821.

Excessively minute, but sufficiently visible to the naked eye, from the fine yellow colour of the fringe it forms at the edge, or round the stems of various marine plants, particularly *Ulva purpurascens*. *Stems* filiform, extremely fine, transparent, continuous, branched, scarcely half a line in height, irregular, each branch terminating in a wedge-shaped body, yellow, and containing several granules towards the centre. The edges of the wedge-shaped bodies are sometimes involute, which at first sight is liable to give them the appearance of being distinctly marginated.

The public is here presented with another of those extraordinary plants, particularly noticed in a preceding number, t. 16. The present species is very elegant, both in form and colour, and by no means rare. When the sun shines, its fine yellow fringe is very conspicuous, if the eye is directed towards

minute objects, in the small rocky pools left by the tide. LYNGBYE is the only naturalist who has described it.

Fig. 1. *Echinella paradoxa, on Ulva purpurascens.* Fig. 2. *A number of plants magnified.*

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HYSTERIUM JUNIPERI.

Juniper-leaf Hysterium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA*, *De Cand. Grev.*—FUNGI, *Juss. Hook.*

GENERIC CHARACTER.

Receptaculum oblongum, rima longitudinali dehiscens. Sporulæ in cellulis elongatis, gelatinosis. Crusta nulla.

Receptacle oblong, bursting by a longitudinal slit. Sporules in elongated gelatinous cells. Crust none.

SPECIFIC CHARACTER.

HYSTERIUM Juniperi; *ovale, nitidum, subplanum, minutum, cellulis sporuliferis apicibus attenuatis.*

H. oval, shining, somewhat plane, minute, the summits of the sporuliferous cells attenuated.

HYSTERIUM Juniperi, *Grev. Fl. Edin. ined.*

HAB. On the dead leaves of the common Juniper (*Juniperus communis*), Balmuto, Miss BOSWELL. Pentland Hills. Mountains of Cairngorm, very abundantly. Summer and autumn.

Very minute, regularly oval, rather depressed, parallel with the nerve of the leaf, shining, and of a deeper black in the centre. When mature, it bursts by a simple slit, which does not extend to either extremity. The *gelatinous mass* formed of the elongated sporuliferous cells, very small; the cells themselves diaphanous, club-shaped, and bluntly attenuated at their summits.

In the autumn of 1821, I found this minute hysterium on the Pentland Hills, and ascertained it to be new. In a late excursion to the Highlands with Dr HOOKER and Mr WALKER ARNOTT, it fell under our observation, in considerable abundance; and Miss BOSWELL has also recently discovered it at Balmuto.

This is one of those species to which I alluded in a preceding number, whose corneous receptacle seems to be formed

out of the very substance of the leaf; nor have I been able to trace any laceration of the epidermis.

Fig. 1. *Plants on Juniperus communis.* Fig. 2. *A leaf with plants.* Fig. 3. *A single receptacle.* Fig. 4. *Sporuliferous cells.*—Figs. 2, 3, & 4. *more or less magnified.*

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CYLINDROSPORUM CONCENTRICUM.

Concentric Cylindrospore.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUSIDOIDEÆ, Grev.* —EPIPHYTÆ, *Link.*

GENERIC CHARACTER.

Plantæ minutissimæ in foliis vivis parasiticæ, non rupta epidermide. Sporidia cylindrica, truncata, non septata, nuda, libera, coacervata.

Very minute plants, parasitic on living leaves, without rupturing the epidermis. Sporidia cylindrical, truncate, jointless, naked, free, forming little heaps.

SPECIFIC CHARACTER.

CYLINDROSPORUM concentricum.

CYLINDROSPORUM concentricum, *Grev. Fl. Edin. ined.*

HAB. On both surfaces of Cabbage leaves (*Brassica oleracea*). Balmuto, Miss BOSWELL. Garden of ALEXANDER SMITH, Esq. Parson's Green. May and June. Also at Foxhall, in September.

Very white, and excessively minute, but sufficiently conspicuous from their number, and from being disposed in concentric lines. *Form* most irregular; frequently oblong, lying in the direction from the centre to the circumference, projecting into angles and little eminences, and having often one extremity turned up like the end of a canoe. *Sporidia* very numerous, cylindrical, truncate at both extremities, pellucid, without joints, and not furnished with any membrane or covering whatever. Turning in decay to a dirty yellow, which always commences in the centre, while new individuals are forming at the circumference.

A very extraordinary plant, first observed by Miss BOSWELL. It does not seem to be very rare, as I have noticed it in various localities since, and probably few gardens will be found without it at some time or other of the year.

The peculiarity of its cylindrical sporidia, and its situation on the surface of living leaves, fully entitle it to generic distinction.

Fig. 1. *Plants, natural size.* Fig. 2. *Single individuals magnified.* Fig. 3. & 4. *Sporidia, more or less magnified.*

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AGARICUS ODORUS.

Fragrant Agaric.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Juss. &c.*
DIV. LEUCOSPORUS CLITOCYBE, *Fries.*—SECT. III. GYMNOPUS, *Pers.*

GENERIC CHARACTER.

Pileus stipitatus aut latere affixus, subtus lamellis sporiferis, rectis simplicibus. Volva nulla.

Pileus furnished with a stem, or fixed by its side, bearing on the under surface, straight and simple lamellæ (gills), containing sporules. Volva (wrapper) none.

SPECIFIC CHARACTER.

AGARICUS odorus; *fragrans, planiusculus plus minusve virescens; pileo lævi; lamellis confertis, pallidis, vix subdecurrentibus; stipite solido subflexuoso.*

Ag. fragrant, somewhat plane, more or less green; pileus smooth; lamellæ numerous, pale, scarcely subdecurrent; stem solid, not straight.

AGARICUS odorus, *Bull.* p. 567. t. 176. et 556. f. 3.—*Humb. Frib. spec.* p. 85. *Sow. Fung.* t. 42.—*With. Bot. Arr.* ed. 6. v. 4. p. 214.—*Pers. Syn.* p. 323.—*De Cand. Fl. Franç.* v. 2. p. 175.—*Ejusd. Syn.* p. 35.—*Alb. et Schw.* p. 170.—*Purt. Midl. Fl.* v. 2. p. 624.—*Fl. Dan.* t. 1611.—*Fries, Syst. Mycol.* v. 1. p. 90.—*Grev. Fl. Edin. ined.*

AGARICUS ærugineus, *Schum. Sælland.* p. 298. (fide Fries).

AGARICUS anisatus, *Pers. Obs. Mycol.* pars 1. p. 44.

GYMNOPUS odorus, *Gray's Nat. Arr.* v. 1. p. 606.

HAB. Moist woods, among moss and dead leaves. Autumn; not uncommon. Shotover Plantations, Oxfordshire, SIBTHORPE. Oversley and Ragley Woods, PURTON. Foxhall, Hallyards, and Newliston Woods, Captain WAUCH. Carlowrie.

Pileus 2–3 inches broad, smooth, convex, at length nearly plane, subumbonate or very rarely depressed, more or less of a green colour, sometimes bluish-grey, very rarely whitish, subirregular, slightly fleshy. *Lamellæ* numerous, pale, whitish or tinged with flesh colour, rather narrow, scarcely at all decurrent. *Stem* 1–2 inches long, solid, somewhat crooked, firm, whitish or greenish, about 2 lines thick.

This is a very beautiful agaric, and it exhales an odour like that of woodroof or new mown hay, especially in dry weather;

one variety smells strongly of aniseed. BULLIARD, who first described it, makes no mention of its properties; but PERSOON, in his *Traité sur les Champignons comestibles*, has placed it among the edible species. He has not, however, given us any directions how to dress it.

In this country it is seldom found in any abundance.

Figs. 1. & 2. *Plants in different states.* Fig. 3. *A section.* Fig. 4. *Sporules, magnified.*

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PUCCINIA FABÆ.

Bean-leaf Puccinia.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.* —EPIPHYTÆ, *Link.*—FUNGI, *Juss. De Cand.*

GENERIC CHARACTER.

Peridium verum 0. *Sporidia uni aut multiloculata, pedicellata, pedicello fixa, et in cæspitulis aggregata foliis vivis parasitici. Epidermis foliorum peridio simillima.*

True peridium 0. Sporidia one or many-celled, pedicellated, fixed by the pedicel, and growing in minute clusters on living leaves. The epidermis bearing a strong resemblance to a peridium.

SPECIFIC CHARACTER.

PUCCINIA Fabæ; *bifrons, nigra, depressa, orbiculata. Sporidia* 1-*loculata, ovato-globosa, pedicellis elongatis, gracilis, albis.*

P. growing on both sides of the leaf, nearly black, depressed, circular. Sporidia, one-celled, ovato-globose, with elongated slender, white pedicels.

PUCCINIA Fabæ, *Grev. Fl. Edin. ined.*

HAB. On the leaves of the common field Bean, (*Vicia Faba*). About Ashbourne in Derbyshire. In Kinross-shire, and around Edinburgh. Summer and Autumn.

Scattered on both surfaces of the leaf, orbicular, blackish, depressed, even, girt over with the remains of the ruptured epidermis, which, before bursting, is of a grey colour. Sporidia densely crowded, one-celled, pretty regularly ovato-globose, fixed by a slender white elongated pedicel.

This must not be confounded with *Uredo Fabæ*, which is often to be seen on the same leaf: the *Puccinia* is much darker, and does not scatter its sporidia, as is frequently the case wtth the *Uredo;* the latter is also more numerous. Under the microscope, the difference is at once perceptible. This is the only species I have observed in this country with unilocular sporidia.

Fig. 1. *Puccinia Fabæ on a leaf of Vicia faba.* Fig. 2. *Ditto, magnified.* Fig. 3. *Sporidia.*

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GLOIONEMA APICULATUM.

Apiculated Gloionema.

Class and Order CRYPTOGAMIA ALGÆ, *Linn.*—Nat. Ord. *ALGÆ, Juss.* &c.

GENERIC CHARACTER.

Fila gelatinosa, tenacia, continua, intus granulis ellipticis vel cylindricis longitudinaliter farcta.

Gelatinous, tenacious and continuous filaments (minute cylindrical fronds), containing longitudinally-arranged elliptical or cylindrical granules.

SPECIFIC CHARACTER.

Gloionema apiculata; *fronde continua, filiforme, ramosa aliquando fasciculata; granulis cylindraceo-oblongis apicibus ramulorum incrassatis apiculatis.*

G. frond continuous, filiform, branched, sometimes fasciculated, containing oblongo-cylindrical granules; apex of the branches incrassated and apiculate.

Gloionema apiculatum, *Grev. in Wern. Trans.* v. 4. p. 215. t. 8. et *Fl. Edin. ined.*

Hab. Attached to marine rocks in small pools left by the tide. Black Rocks at Leith, in company with Mr Walker Arnott. March. Also, but sparingly, between Newhaven and Caroline Park.

Tufted, lax, about half an inch high, flexible, growing upright in the water. *Fronds* filiform, continuous, about as thick as a hog's bristle, yellowish or olive green, tenacious, simple at the base, but soon becoming branched, and often somewhat fasciculated, summits incrassated, of a darker colour, often shortly forked, and furnished with a semipellucid apiculus. The whole frond is filled with a transparent gelatinous mass, containing cylindrical granules, which escape by incision and slight pressure.

This singular plant belongs to a very puzzling genus, one species of which is well known in this country, under the name of *Conferva fœtida*, and is figured somewhat inaccurately by Dillwyn. Agardh describes two other species, *paradoxa* and *chthonoplastes*, the latter of which is certainly not a true *Gloionema*. Lyngbye, in the place of this genus has substituted one of his own; and, under *Bangia*, has, in addition to

the above species, added one decided *Gloionema* (*rutilans*), *Conferva rutilans*, ROTH, *Cat. Bot.* 3. p. 179.

In Wernerian Transactions, I have proposed to retain both genera, and to refer to *Bangia* only those species which have their granules arranged in the form of transverse striæ.

I have been induced to figure this plant in an early number, on account of the very indifferent manner in which it was executed for the Wernerian Transactions, when an unavoidable absence from Edinburgh prevented my superintendence.

Fig. 1. *Plants, natural size.* Fig. 2. *A plant magnified.* Fig. 3. *A summit of a branch; and,* Fig. 4. *Granules,—both magnified.*

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UREDO LINI.

Flax-leaf Uredo.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.* —EPIPHYTÆ, *Link.*—FUNGI, *Juss. De Cand. &c.*

GENERIC CHARACTER.

Peridium verum 0. *Sporidia plerumque globosa, non septata, nuda, libera. Plantulæ " sub epidermide foliarum herbacearum ortæ et epidermide rupta, facilè dispersæ"* (DE CAND.). *Epidermis peridio simillima.*

No true peridium (membrane enclosing the sporidia). Sporidia mostly globose, unilocular, naked, free, bursting through the epidermis of the leaves of herbaceous plants, and easily dispersed; epidermis bearing a strong resemblance to a true peridium.

SPECIFIC CHARACTER.

UREDO Lini; *sparsa, ovata, flavo-aurantiaca, convexa, sporidiis numerosis subsphæricis.*

U. scattered, ovate, orange-yellow, convex; sporidia numerous, subsphærical.

UREDO Lini, *De Cand. Fl. Franç.* v. 2. p. 234.—*Ejusd. Syn.* p. 49.—*Grev. Fl. Edin. ined.*

UREDO miniata, var. *β*, *Pers. Syn. Fung.* p. 216.

UREDO polymorpha, var. *η*, *Strauss, in Annal. Soc. Wetterav.* 2. p. 88.

HAB. On both surfaces of the leaves of *Linum catharticum;* not unfrequent in Summer.

Bright yellow-orange, scattered, on the leaves and even stem, convex, of various forms, chiefly roundish or ovate, pulverulent, sporidia numerous, subglobose, containing dark-coloured granules, according to the observations of DE CANDOLLE.

A very abundant *Uredo* in dry heathy pastures, and offering nothing peculiar for observation.

Fig. 1. *Plants, nat. size.* Fig. 2. & 3. *Ditto, more or less magnified.* Fig. 4. *Sporules.*

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ASPERGILLUS PENICILLATUS.

Single-tufted Aspergillus.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *BYSSOIDEÆ, Grev.* —MUCEDINES, *Link.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Minutus, cæspitosus vel sparsus. Plantulæ filamentosæ simplices vel ramosæ septatæ, apicibus plerumque clavatis, et capitulis sporidiarum instructis.

Minute, tufted or scattered. Filamentous, jointed, branched or simple plants, the apex mostly clavate, and bearing little heads of sporidia.

SPECIFIC CHARACTER.

ASPERGILLUS penicillatus; *cinereus, sparsus, gregarius, simplex; capitula sporidiarum laxa, subnutantia; sporidiis moniliformibus.*

A. grey, scattered, gregarious, simple; heads of sporidia lax, somewhat drooping; sporidia moniliform.

ASPERGILLUS penicillatus, *Grev. Fl. Edin. ined.*

HAB. On damp grasses in the herbarium.

Dark grey, scattered, distinct, regularly gregarious, but not in the least tufted, $\frac{3}{4}$ of a line high, the stem formed of 2–5 long transparent joints. *Sporidia* forming long beaded filaments, a number of which are clustered into a somewhat drooping head.

A very beautiful object under the microscope, and probably of not unfrequent occurrence.

The genus was first established by MICHELI, in *Nova Plantarum Genera*, p. 212; and has been continued by LINK, NEES, and other mycologists. The sporidia are not always arranged in a beaded manner: the exceptions, however, are few, and they do not affect the generic character.

Fig. 1. *Plants, natural size.* Fig. 2. *The same magnified.*

33

ERINEUM AUREUM.

Golden Erineum.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.*—MUCEDINES, *Link.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Planta epiphylla, depressa, subgrumosa vel sericea, vel filamentosa, ex tubis cylindricis vel compressis, clavatis aut turbinatis, in cæspitulis latis congestis, composita.

Plant epiphyllous, depressed, subgrumose, velvety, or filamentous, composed of cylindrical or compressed, club-shaped or turbinate tubes, collected into broad tufts.

SPECIFIC CHARACTER.

ERINEUM aureum; *hypo- rarè epiphyllum, sericeum, aureum, late effusum; tubis flavis simplicibus minutissimis clavatis.*

E. on the under, rarely the upper surface of the leaf, sericeous, gold-colour, broadly effused; tubes yellow, simple, very minute, club-shaped.

ERINEUM aureum, *Pers. Syn. Fung.* p. 700.; et *Mycol. Europ.* sect. 1. p. 8. —*De Cand. Fl. Franç.* v. 6. p. 14.—*Ejusd. Syn.* p. 15.—*Alb. et Schw. Conspect. Fung.* p. 371.—*Grev. in Edinb. Phil. Journ.* v. 6. No. 12. p. 81. t. 3. f. 15. et *Fl. Edin. ined.*

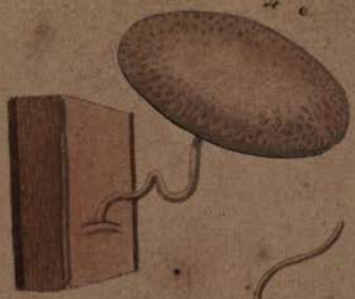
HAB. On the leaves of *Populus nigra*, in summer and autumn. Glasgow Botanic Garden, Dr HOOKER. Carlowrie, near Edinburgh, and elsewhere, not unfrequent.

There can be no difficulty in ascertaining this species, as it is the only one of a bright-yellow colour. It appears, at first, in a small spot, with a yellow tinge, and forming a small hollow in the leaf; but it speedily becomes larger, brighter, and often spreads so much as to cover a great part of the surface. When in perfection, it is sericeous, and of a fine golden colour. The deep colour is evidently derived from the *sporules*, which are excessively minute, but sufficiently visible under a high power of the microscope.

One of the finest *Erinea* we possess, and of some importance, as the fructification is more evident than in any other species. Under a high magnifying power, the sporules are

very evident, both when contained in the tubular peridia, and when discharged. This circumstance is sufficient to exclude *Erineum* from the *Mucedines* of LINK, and the *Trichomyci* of PERSOON, with which it has few points in common. Its nearest affinity is to some of the *Mucores*.

Figs. 1. & 2. *E. aureum, natural size, on Populus nigra.* Fig. 3. *Tubular peridia.* Fig. 4. *Sporules.*—Figs. 3, & 4. *more or less magnified.*



34

CYATHUS CRUCIBULUM.

Crucible-like Cyathus.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *GASTROMYCI, Link. Grev.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Receptaculum (Peridium?) cyathiforme, primo epiphragmate clausum, dein apertum. Sporulis in corpusculis lenticularis fundo receptaculi.

Receptacle (Peridium?) cup-shaped, while young closed by a membrane, afterwards open. Sporules contained in lenticular bodies lying at the bottom of the receptacle.

SPECIFIC CHARACTER.

Cyathus crucibulum; *subcylindricus vel campanulatus, demum lignosus, extus ochraceus subtomentosus, intus lævis.*

C. subcylindrical or campanulate, at length woody, ochrey-yellow, externally subtomentose, smooth within.

Cyathus crucibulum, *Pers. Syn. Fung.* p. 238.—*Alb. et Schw.* p. 139.—*Hook. Fl. Scot.* Pt. 2. p. 18.—*Grev. Fl. Edin. ined.*

Cyathus crucibuliformis, *Hoffm. Veg. Crypt.* 2. p. 29. t. 8. f. 1.—*Gray's Nat. Arr.* v. 1. p. 587.

Cyathus lævis, *De Cand. Fl. Franç.* ed. 3. v. 2. p. 269.—*Ejusd. Syn.* p. 56.

Nidularia lævis, *Bull.* t. 488. f. 2.—*Holmsk. Fung. Dan.* 2. No. 1.—*With. Bot. Arr.* ed. 6. v. 4. p. 427.—*Sibthorpe, Fl. Oxon.* No. 1112.—*Relh, Fl. Cant.* ed. 3. p. 560.—*Sow. Eng. Fung.* t. 30.—*Purt. Midl. Fl.* v. 3. p. 266. t. 17. f. 2.

Peziza crucibuliformis, *Schæff. Fung.* 2. t. 179.—*Scop. Fl. Carn.* 2. No. 1630.—*Lightf. Fl. Scot.* v. 2. p. 1049.

Peziza lævis, *Hud. Fl. Angl.* 2. p. 634.

Peziza pyxis, *Batsch. Eleuch. Fung.* fasc. 1. p. 129.

Peziza lentifera, *Œd. Fl. Dan.* t. 105.

Peziza sessilis, campanulata, &c. *Gled. Meth. Fung.* p. 138. t. 4.

Cyathoides luteum crucibuliforme, *Mich. Gen. Pl.* t. 102. f. 3.

Fungus seminifer, minor, &c. *Raii, Syn.* p. 20. t. 1. f. 2. b. c.

Hab. On rotten wood, sticks, straws, &c. The whole year. Scotland, *Lightf.* Foxhall, Captain Wauch. Lockerbie, Sir William Jardine. Abundant near Edinburgh.—Combewood, near Kingston, *Sow.* Norwich, Mr Pitchford. Near Coleshill, Rev. W. Bree.

Gregarious, more or less yellow. *Receptacle* or peridium, very smooth within, and not striated; without, subtomentose, especially at the base; in

old age hard, coriaceous, often ligneous. In its earliest state, it is globular, and completely closed by a membrane of a darker colour; before this is ruptured, the plant becomes cylindrical, and eventually campanulate. *Lenticular bodies* attached to the side of the receptacle by a slender flexuose cord, which is incrassated only at its origin. *Sporules* oval, minute, within the lenticular bodies.

A very interesting and small genus of plants, of a highly curious structure, and little understood; though, as appears from the synonymes, they have been long noticed by botanists. In the early state, and until the rupture of the epiphragma, or membrane which closes the orifice, the substance of the lenticular bodies is carnose, and a dissection under the microscope is confused and unsatisfactory. When mature, they are firm, and rather hard exteriorly, and an examination readily shews them to contain a great number of sporules, which doubtless are nourished by means of the little stem-like cord which attaches the lenticular bodies to the side of the receptacle. This cord is distinctly composed of filaments of a large size, compared with those of the rest of the plant, possessing a wonderful degree of elasticity, and having also a strong hygrometric property. If examined in a moist state, the cord is capable of being drawn out to a great extent, especially in *Cyathus striatus*, where naturally it is not more than $\frac{1}{8}$th of an inch in length, but allows of an extension of 4 inches before it breaks. In the species under consideration, there is a small cavity on the under side of the lenticular body, which receives an incrassated portion of the cord, differing in this respect from the other known species.

Link has given a figure of a section of one of the lenticular bodies of *Cyathus olla*, with the sporules, in the Berlin Magazine, v. iii. t. 2. f. 53.

Fig. 1. *Mature plants.* Fig. 2. *Young ditto.* Fig. 3. *Section of a receptacle.* Fig. 4. *A lenticular body, with its attachment.* Fig. 5. *Ditto, shewing the under side, and with a part of its thick fibrous covering removed, to exhibit the immediate covering of the sporules.* Figs. 6. & 7. *Sections of a lenticular body, shewing the sporules.* Fig. 8. *Filaments of the cord after having been extended above 3 inches.*

ECHINELLA CIRCULARIS.

Circular Echinella.

Class and Order CRYPTOGAMIA ALGÆ, *Linn.*—Nat. Ord. *CHÆTOPHOROIDEÆ, Grev.*—ALGÆ, *Juss.* &c.

GENERIC CHARACTER.

Corpuscula minuta, subgelatinosa, sparsa, vel in massa congesta, sessilia vel stipitata, subhyalina, granulis coloratis internis.

Minute gelatinous bodies, scattered or crowded into a dense mass, sessile or stipitate, subhyaline, and containing coloured granules.

SPECIFIC CHARACTER.

Echinella circularis; *filis simplicibus, strictis, longitudinaliter æqualibus, compactis, cuneatis, in circulo plano dispositis.*

E. filiform bodies simple, straight, equal in length, compact, wedge-shaped, ranged in a plane circle.

Echinella circularis, *Grev. in Wern. Trans.* v. 4. p. 213. t. 8. f. 2. et *Fl. Edin. ined.*

Hab. In marshes, attached to leaves, straws, &c. and in rivulets. Near Edinburgh, Mr Walker Arnott. Dumbryden Quarries; and in the King's Park. Spring.

Forming either a dense dark green mass, $\frac{1}{4}$–1 inch broad, of a slight submetallic lustre, or dispersed and attached irregularly to dead leaves, &c. in watery places. Under the microscope, the individual plants are found to be very minute, perfectly circular and plane, each circle being composed of wedge-shaped filiform transparent bodies, more or less hyaline at the extremities. The circles are of various sizes, and, from their fragile nature, rarely found entire. Each filiform body contains a greenish-yellow mass. In the centre of each circle is an unoccupied space, probably its place of attachment.

This highly curious plant is, if possible, more extraordinary than the two species already figured in this work. Its regularity, and singular structure, are truly wonderful, and at first sight, it has more the appearance of a delicate work of art than

the production of nature; but when we consider its excessive minuteness, its perfection irresistibly reminds us, that in "nature the causes are few, and the effects indeed inexhaustible; while in art, how many causes are necessary to produce one effect."

Fig. 2. & 2. *both magnified.*

HELVELLA MITRA.

Mitra-like Helvella.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI*, *Juss.* &c.

GENERIC CHARACTER.

Pileus submembranaceus, stipitatus, subdifformis, utrinquè lævis, lateribus deflexis; cellulis elongatis sporuliferis in pagina superiore.

Cap furnished with a stem, submembranaceous, irregular in form, smooth on each surface, deflexed at the sides, and bearing elongated sporuliferous cells on the superior surface.

SPECIFIC CHARACTER.

HELVELLA Mitra; *pileo livido, inflato, stipite plus minusve adnato, rarissimè demum libero; stipite sulcato-lacunoso, pallido.*

H. cap livid, inflated, more or less adnate with the stem, at length very rarely free; stem furrowed and lacunose, whitish.

HELVELLA Mitra, *Linn. Sp. Pl.* 1649.—*Bull.* p. 298. t. 190. et 466.—*Pers. Syn. Fung.* p. 615.—*De Cand. Fl. Franç.* v. 2. p. 94.—*Ejusd. Syn.* p. 19.—*Alb. et Schw.* p. 298.—*Huds. Fl. Angl.* v. 2. p. 632.—*Lightf. Fl. Scot.* v. 2. p. 1047. (excl. var. β.)—*With. Bot. Arr.* ed. 6. v. 4. p. 406. (*excl. Syn. Sow.* t. 39.)—*Relh. Fl. Cant.* ed. 3. p. 550.—*Nees' Syst.* t. 18. f. 163.—*Hook. Fl. Scot.* Pt. 2. p. 31. (*excl. Syn. Sow.* t. 39.)—*Purt. Midl. Fl.* v. 3. p. 255. & 451. t. 16. (*central fig.?*)—*Grev. Fl. Edin. ined.*

HELVELLA lacunosa, *Holmsk.* v. 2. p. 45. t. 24.

HELVELLA sulcata, *Willd. Berol.* p. 398. *(fide Pers.)*

ELVELLA Mitra, *Œder. Fl. Dan.* t. 116.

ELVELLA nigricans, *Schæff.* t. 154.

ELVELLA monacella, *Schæff.* t. 162.

FUNGUS terrestris, pediculo striato, &c. *Raii, Syn.* 8. No. 39.

FUNGOIDES fungiforme, &c. *Mich.* p. 204. t. 86. f. 7.

HAB. On the ground, in shady places, among grass. Foxhall, Captain WAUCH. Balmuto; Millburn; Abercorn Park, Duddingston; all near Edinburgh.—Near Bungay, Mr WOODWARD. At Edgebaston, WITHERING. Not common either in England or Scotland. Autumn.

Pileus membranaceous, thin, smooth on both sides, of different shades of colour, but mostly dark and livid, inflated, partially adnate with the stem, irregular in form, but, when young, always more or less deflexed at the sides, and, from being thus folded down, two or three prominent ascending lobes are formed, which often bear a resemblance to a Bishop's Mitre, whence the specific name. *Stem* 2–6 inches high, ½–1½ inches thick,

whitish, channelled, and lacunose, variously divided through its whole substance into large longitudinal cavities, the parietes of which are thin, and semitransparent like wax. *Sporuliferous cells*, situated in the upper surface of the pileus, very long, filiform, pellucid, containing a number of globular hyaline sporules, in a single row, which, escaping in sudden jets, form the elastic vapour observed by the naked eye to proceed occasionally from mature plants. The cells themselves are often partly exserted, probably from the same cause which produces the forcible discharge of the sporules.

It is a singular fact, that, although three figures have been published in this country under the name of *Helvella Mitra*, none should in reality belong to that species. BOLTON's plant (t. 95. of his Hist. of Funguses), is *H. elastica* of BULLIARD; and *H. fuliginosa* of SOWERBY. The species published for our plant, by the last-named author, is *H. leucophæa* of PERSOON. This is again figured by Mr PURTON, in his Midland Flora, t. 16. The above mistakes have occasioned much confusion in our local Floras, and renders it difficult to ascertain how far the true plant is distributed throughout the country.

DE CANDOLLE, following BULLIARD, affirms the sporules to be projected from the *inferior* surface; while PERSOON, even in his work now publishing, altogether neglects to notice so important a circumstance. Professor LINK, however, ascertained them to proceed from the *superior* surface, which a glance with the microscope is sufficient to confirm.

All the species of this genus are wholesome and excellent: they resemble the Morelle, and are constantly employed on the Continent in the same way.

Fig. 1. *H. Mitra.* Fig. 2. *A smaller specimen in old age, and of a paler colour.* Fig. 3. *Section of the stem.* Fig. 4. *A small portion of the pileus, shewing the sporuliferous cells.* Fig. 5. *Sporuliferous cells and sporules.*— Figs. 4. & 5. *Magnified.*

CLAVARIA FRAGILIS.

Brittle Clavaria.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *FUNGI, Juss.* &c.

GENERIC CHARACTER.

Plantæ carnosæ, plus minusve cylindraceæ, simplices vel ramosæ. Hymenium læve, omnem fere superficiem occupans, cum stipite confluens. Sporulæ albidæ vel ochraceæ.

Carnose plants, more or less cylindrical, simple or branched. Hymenium smooth, occupying almost the whole surface, and confluent with the stem. Sporules white or ochraceous.

SPECIFIC CHARACTER.

Clavaria fragilis; *simplex, aurea vel alba, gregaria, plerumque solida, valde fragilis, flexuosa, basin versus attenuata, ætate subrugosa.*

Cl. simple, deep yellow or white, gregarious, mostly solid, very fragile, flexuose, attenuated towards the base, and in age subrugose.

Clavaria fragilis, *Holmsk.* v. 1. p. 7. *with a fig.*—*Pers. Comm.* p. 77.—*Schum. Sælland.* p. 404.—*Fries, Syst. Mycol.* v. 1. p. 484.—*Grev. Fl. Edin. incd.*

Clavaria eburnea, *Pers. Syn. Fung.* p. 603. et *Mycol. Europ.* v. 1. p. 183.—*Alb. et Schw.* p. 291.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 97.—*Ejusd. Syn.* p. 20.

Clavaria gracilis, *Bolt. Fung.* t. 111. f. 1.—*Sow. Fung.* t. 232.—*Gray's Nat. Arr.* v. 1. p. 654.

Clavaria cylindrica, *Bull. Champ.* p. 212. t. 463. f. 1.—*Pers. Comm.* p. 76.—*Gray's Nat. Arr.* v. 1. p. 656.

Clavaria pistilliformа, *Pers. Mycol. Europ.* v. 1. p. 183. (*excl. syn. Sow.* t. 90.)

Clavaria solida, *Pers. Comm.* p. 78.

Clavaria vermiculata, *Pers. Mycol. Europ.* v. 1. p 184.

Clavaria polymorpha rufa? *Fl. Dan.* t. 775. f. 1.

Clavaria minima nivea? *Micheli, Nov. Gen. Pl.* p. 208. t. 87. f. 6.

Clavaria lutea, minima, *Mich. loc. cit.* p. 208. t. 87. f. 5.

Clavaria vermiculata, non fistulosa candida, *Mich. loc. cit.* p. 209. t. 87. f. 12.

Hab. On the ground in moist places, especially woods, almost always on the bare soil. Autumn. Foxhall and Newliston Woods, Captain Wauch. Balmuto; Slateford;—all near Edinburgh.—Nork Park, Lady Arden.

Whole plant 1 to 2 inches in height, gregarious, scattered or growing in small tufts of three or four together, simple, attenuated towards the base, cylindrical or subcompressed, subequal, and generally about one to two

lines in thickness, but varying in this respect considerably, being sometimes incrassated upwards, and even bifid, or slightly irregular at the apex: it is mostly solid, acquiring, however, a small cavity in age, firm between the fingers, but remarkably brittle, smooth, in age subrugose, colour varying to every shade between white and golden-yellow. It is generally flexuose, and sometimes quite crooked.

It is very difficult to clear up the confusion that exists in the older authors respecting the unbranched *Clavariæ*, and indeed in many modern ones also. The figures of MICHELI are but of little use, where the species approach so near to each other, and his descriptions amount almost to nothing. PERSOON was the only author, previous to the publication of the *Systema Mycologicum* of FRIES, on whom any dependence could be placed; but even *his* uncertainty is evinced by the changes he was constantly making in his own works, from the *Commentatio* to the *Synopsis Fungorum*. In his new *Mycologia Europæa*, the first part of which has appeared, he does not seem to have removed the difficulties attending this tribe, but rather to have increased them, by unnecessarily multiplying species, as will be perceived by the synonymes, and consulting his work. FRIES, whose first volume appeared before PERSOON's *Mycologia*, has been much more judicious; but he has perhaps fallen into a contrary extreme. In regard to the present species, however, he has in my opinion shown a correct judgment; and I have, after an examination to satisfy myself, gladly followed him.

Fig. 1. *Plants, nat. size.* Fig. 2. *A plant divided.* Fig. 3. *Sporuliferous cells and sporules.* Figs. 2. & 3. *magnified.*

LYCOGOLA MINIATA.

Scarlet Lycogola.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *GASTROMYCI, Link. Grev.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Plantulæ (sporangia) sessiles, globosæ vel difformes, prima ætate fluidiusculæ. Peridium simplex, fragile, irregulariter rumpens. Sporulæ filamentis paucis intermixtæ.

Small plants (sporangia), sessile, globose or irregular, at first almost fluid. Peridium simple, fragile, variously bursting. Sporules intermixed with a few filaments.

SPECIFIC CHARACTER.

Lycogola miniata; *gregaria, globosa, miniata, demum fuscescens; sporulis prima ætate coccineis pulposis, dein pulverulentis griseo-purpureis.*

L. gregarious, globose, red, at length brown; the sporules at first bright scarlet and pulpy, afterwards pulverulent, and purple-grey.

Lycogola miniata, *Pers. Disp. Method. Fung.* p. 7.—*Obs. Mycol.* 2. p. 26.—*Syn. Fung.* p. 158.—*Alb. et Schw.* p. 85.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 261.—*Ejusd. Syn.* p. 54.—*Nees' Syst.* t. 8. f. 97.—*Hook. Fl. Scot.* Pt. 2. p. 11.—*Gray's Nat. Arr.* v. 1. p. 568.—*Grev. Fl. Edin. ined.*

Lycoperdon epidendrum, *Gunn. Fl. Norveg.* No. 1042.—*Leys. Fl. Hal.* No. 1269.—*Leers. Fl. Herb.* No. 1120.—*Baumg. Fl. Lips.* No. 1693.—*Willd. Fl. Berol.* No. 1202.—*Roth. Fl. Germ.* v. 1. p. 551.—*Lilieblad, Svensk. Fl.* p. 355.—*Retz, Fl. Scand.* No. 2001.—*Host. Syn. Pl. Aust.* p. 655.—*Holmsk.* v. 2. p. 58. t. 31.—*With. Bot. Arr.* ed. 6. v. 4. p. 457.—*Bolt. Fung.* t. 119. f. 1.—*Sow. Fung.* t. 52.—*Huds. Fl. Angl.* v. 2. p. 645.—*Relh. Fl. Cantab.* ed. 3. p. 566.—*Purt. Midl. Fl.* v. 2. p. 701.

Lycoperdon epidendron, *Buxb. Enum.* p. 203. et (L. sanguineum sphæricum) *Pl. min. cogn. Cent.* 5. t. 29. f. 2.—*Linn. Fl. Suec.* ed. 2. p. 459. et *Sp. Pl.* 1654.—*Œd. Fl. Dan.* t. 720.—*Poll. Hist. Pl. Palat.* No. 1198.—*Lightf. Fl. Scot.* p. 1068.

Lycoperdon læve, sphæricum, &c. *Hall. St. Helv.* No. 2173.

Lycoperdon sphæricum sessile, &c. *Gled. Method. Fung.* p. 150.

Lycoperdon sanguineum sphæricum, *Rupp. Fl. Jen.* p. 304.

Lycogola globosum, grani pisi, &c. *Mich.* p. 216. t. 95. f. 2. A.

Galeperdon epidendron, *Wigg. Fl. Holsat.* No. 1148.

Mucor fragiformis, *Schæff. Fung.* t. 193.

Bovista miniata, *Dill. Catal. Pl. Giss.* p. 197.

Tremella nigricans, *Bull. Champ.* p. 217. t. 455. f. 1.

Fungus coccineus minimus, &c. *Raii, Syn.* ed. 2. p. 336.

HAB. On rotten wood in the autumn and spring. Common throughout the whole kingdom.

About the size of a pea, gregarious, globose or irregular, sometimes partly confluent, soft and pulpy in the young state, and of a bright red or orange-scarlet colour: in old age changing to a light brown, rarely to a brown-black; the peridium is then extremely thin and brittle, and bursting irregularly, discharges a profuse purplish powder, consisting of the globular sporules, intermixed with a few filaments arising from the inner surface of the peridium. With the assistance of a magnifier, the external surface is found to be thinly scattered over with minute granules.

This is a highly beautiful plant, previous to its changing to a brown colour; and even then there is a neatness about it, which, notwithstanding it is of frequent occurrence, renders it always a pleasing object to the mycologist. When quite young, the interior is in such a pulpy state, as to exude in drops when the plant is wounded.

From the striking characters of this species, we find it faithfully described by a host of writers, and diffused through every part of Europe. The synonymes might therefore have been multiplied; but our limits would scarcely have permitted it, nor would any advantage have accrued.

In regard to *Lycogola* as a genus, LINK has well observed, that there is no character by which many *Liceæ* can be distinguished from it. Several *Liceæ*, however, are actually furnished with internal filaments, and are therefore true *Lycogolæ*, as he has himself remarked, and the difficulty is thus easily removed, by bringing them under this genus.

Fig. 1. *Plants, nat. size, in different states.* Fig. 2. *Plants magnified.* Fig. 3. *A portion of the peridium; and,* Fig. 4. *Sporules and filaments,—both magnified.*

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SPHÆRIA VERRUCOSA.

Warty Sphæria.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *HYPOXYLA, De Cand. Grev.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Receptaculum 0. *Sphærulæ corneæ, liberæ, sessiles aut subimmersæ, sparsæ vel congestæ, ore interdum elongato, aliquando nullo; intus gelatinosæ, sporulis in tubis filiformibus nidulantibus.*

Receptacle 0. Spherules free, corneous, sessile or subimmersed, scattered or crowded, the mouth sometimes elongated, sometimes none; interior filled with a gelatinous mass, in which are numerous filiform tubes, containing sporules.

SPECIFIC CHARACTER.

Sphæria verrucosa; *minuta, nigra, sparsa, globosa, valde verrucosa, in pileo Polypori abietini parasitica.*

Sp. minute, black, scattered, globose, very warty, parasitic on the pileus of Polyporus abietinus.

Sphæria verrucosa, *Grev. Fl. Edin. ined.*

Hab. On the pileus of Polyporus abietinus, and probably several other species in autumn and winter. Near Taymouth, Mr Macintosh. Carlowrie, near Edinburgh.

Gregarious, scattered, globose, sometimes oval, quite black, rough with warts, the interstices deep; no trace of an orifice; within, containing a gelatinous mass, filled with cylindrical hyaline tubes, inclosing the sporules.

Those plants of the old genus *Sphæria* which are destitute of an orifice, constitute an excellent section in Persoon's System, under the name of *Astomæ*. Mr Gray, in his *Natural Arrangement of British Plants*, has formed a new genus of them, which he calls *Astoma*. A distinction, however, which may be unexceptionable in a *section*, may be highly inadmissible in a *genus*. The only difference between the *Sphæria* and the *Astoma* of Mr Gray, is the presence and absence of a mouth to the spherules,—a character certainly not of itself

sufficient to separate plants most closely allied in every other respect. Besides, the orifices of *his Sphæriæ*, vary from being much elongated, to a minute opening, not rising above the surface; and in several of his *Astomæ*, though the mouthless character is constant enough to place them under a general division, yet, in some instances, I have ascertained distinct orifices to exist; especially in his *Astoma hederæ*, *A. lauri*, *A. bifrons*, and *A. concavum;* the two latter of which do not seem to belong either to *Sphæria* or to *Phacidium* of KUNZE and and SCHMIDT, but approach most nearly to *Nœmaspora*. The genus *Sphæria*, according to the view I have taken of the whole tribe, since I commenced this work, may advantageously include those *Astomæ*, which in other respects agree with my generic character. Some will come under my genus *Cryptosphæria;* and there are a few that require more minute examination before a place can be assigned to them.

The present species, which is by no means devoid of beauty, I was fortunate in finding, near twelve months ago, in Mr FALCONER's grounds at Carlowrie. I have also recently received it from Mr MACINTOSH, late Gardener to the Earl of BREADALBANE, a most indefatigable searcher of plants, and to whom we are indebted for the first specimens of *Hypnum rugulosum* discovered in Scotland.

I cannot, perhaps, do better than mention in this place, that another industrious botanist, Mr BAXTER, the Curator of the Botanic Garden at Oxford, intends shortly to illustrate the Cryptogamia of Oxfordshire, by publishing fasciculi of dried specimens of the plants of that difficult Class. On the utility of such a publication, it is needless to enlarge: it has indeed been proved by the excellent one on the Mosses, by Mr HOBSON of Manchester. Mr BAXTER's will include every order of the Class Cryptogamia, rejecting only those species of the order *Fungi* which are too fleshy or gelatinous to preserve by pressure.

Fig. 1. *verrucosa, on Polyporus abietinus.* Figs. 2. *The same.* Fig. 3. *Two spherules removed.* Fig. 4. *A spherule divided.* Fig. 5. *Sporuliferous cells, with sporules.—All, except the first, more or less magnified.*

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LYCOGOLA MINUTA.

Minute Lycogola.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Link. Grev.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Plantulæ (sporangia) sessiles, globosæ vel difformes, prima ætate fluidiusculæ. Peridium simplex, fragile, irregulariter rumpens. Sporulæ filamentis paucis intermixtæ.

Small plants (sporangia) sessile, globose or irregular, at first almost fluid. Peridium simple, fragile, variously bursting. Sporules intermixed with a few filaments.

SPECIFIC CHARACTER.

LYCOGOLA minuta; *gregaria, alba, ovata, subconfluens, depressa, valde fragilis; sporulis nigris.*

L. gregarious, white, ovate, subconfluent, depressed, extremely fragile; sporules black.

LYCOGOLA minuta, *Grev. Fl. Edin. ined.*

HAB. On decayed leaves, sticks, straws, &c. that have been heaped together. Autumn. Woods at Foxhall, Captain WAUCH, and GREVILLE.

Gregarious, irregular in form, but mostly ovate, $\frac{1}{2}$–1 line in diameter, two or three sometimes confluent, white, depressed, very brittle, black within, and containing oval sporules, but not in great abundance, intermixed with a few filaments.

This species has much the habit of a *Licea*, but, from possessing filaments among the sporules, must be referred to this place. In its young state, it is probably soft and pulpy, as it is not unfrequently found confluent.

Fig. 1. *Plants, nat. size.* Fig. 2. *Ditto, magnified.* Fig. 3. *A plant ruptured.* Fig. 4. *Sporules and filaments,—both magnified.*

AGARICUS GILVUS.

Variable Wood Agaric.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *FUNGI, Link, Grev.* Div. Leucosporus, *Fries.*—Sect. IX. Omphalia, *Pers.*

GENERIC CHARACTER.

Pileus stipitatus at latere affixus, subtus lamellis sporiferis, rectis, simplicibus. Volva nulla.

Pileus furnished with a stem or fixed by its side, bearing on the under surface straight, simple lamellæ (gills), bearing sporules. Volva (wrapper) none.

SPECIFIC CHARACTER.

Agaricus gilvus; *magnus, pileo convexo, umbonato, demum infundibuliformi, lævi, firmo, plerumque pallido; lamellis angustis, decurrentibus, e pallido-gilvis; stipite recto, solido, subradicato.*

Ag. large; pileus convex, umbonate, at length funnel-shaped, smooth, firm, generally pale; lamellæ narrow, decurrent, pale or reddish; stem straight, solid, somewhat radicating.

Agaricus gilvus, *Pers. Syn. Fung.* p. 448., *cum Syn. unico Vahl.—Fl. Dan.* t. 1606.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 170. *excl. syn. Bull.—Alb. et Schw.* p. 216.—*Fries, Syst. Mycol.* v. 1. p. 81.—*Grev. Fl. Edin. ined.*

Agaricus pileolarius, *Bull. Champ.* t. 400.—*De Cand. Fl. Franç.* 2. p. 173. —*Sow. Fung.* t. 61. *benè.*—*Purt. Midl. Fl.* v. 2. p. 623. et v. 3. p. 393.

Agaricus caseus, *With. Bot. Arr.* ed. 6. v. 4. p. 205.——*Relh. Fl. Cantab.* ed. 3. p. 522.

Agaricus mollis, *Bolt. Fung.* t. 40.??

Agaricus geotropus, *Bull. loc. cit.* p. 521. t. 573. f. 2.—*De Cand. loc. cit.* p. 172.

Agaricus cyathiformis, *Fl. Dan.* t. 1011.

Agaricus subinvolutus, *Batsch. Elench. Fung.* cont. 2. p. 57. t. 37. f. 204.??

Agaricus gibbus, *var. β, (Ag. geotropus, Bull.) Fries, Syst. Mycol.* v. 1. p. 82.

Agaricus infundibuliformis, *Purt. Midl. Fl.* v. 3. p. 393. *quoad syn. Pers.*

Omphalia gilva, *Gray's Nat. Arr.* v. 1. p. 612. *quoad syns. Vahl et Pers.*

Gymnopus nebularis, *Gray, loc. cit.* p. 609. *in part.*

Hab. In woods, autumn. Newliston woods, near Edinburgh, Messrs Wauch and Greville.—Nork Park, Lady Arden. Woods about London, Sowerby.

Pileus compact, neat, 2–4 inches broad, convex when young, umbonate, the margin gradually rising as the plant advances in growth, at length ren-

dering it quite concave and cyathiform, the extreme margin being however always involute; the surface is very smooth; substance close, firm; colour varies from a dead yellow-white to a reddish cream colour or even pale red? the centre generally remains umbonate to the last. *Lamellæ* numerous, narrow, often lacerated, the long ones decurrent, whitish, becomes tinged with red, especially at their margin. *Stem* 2–6 inches high, $\frac{1}{2}$–$\frac{3}{4}$ of an inch thick, firm, solid, cylindrical, sometimes slightly attenuated upwards, pale, usually nearly similar in hue to the pileus, the base subradicating, *i. e.* penetrating somewhat into the ground.

The circumstance, that this variable species changes its appearance completely, in advancing to maturity, has occasioned so much confusion, as to render it a most unpleasant task to follow it in its progress, under as many names as it has colours and forms. SOWERBY, I think, has made a just remark, in supposing BULLIARD, and other authors, to have described it before it had attained the proper stage of growth. PERSOON's character is tolerably correct; but he has added synonymes which belong to another species, viz. *Ag. flaccidus* of SOWERBY and FRIES. BULLIARD gives a figure of our plant, and under our name, but subsequently (not considering it worthy of distinct letter-press) refers to it in his description of *Ag. geotropus*, which I certainly esteem a mere variety, though DE CANDOLLE and FRIES make it a separate species. BATSCH, in his text, seems to have the true plant in view, but his figures are very bad and doubtful. There are three plants which appear to me still more suspicious, though cited by FRIES without a question, *Ag. cinnamomeus*, BOLT. and *Ag. castaneus* and *sordido-flavus* of WITH. Of the first no dissection is given, but the stem hollow in age, tearing into filaments, and incrassated upwards, is quite enough to dismiss it. For the discrepancies of the two others, I refer the reader to WITHERING, ed. 6. pp. 214. and 249.

Fig. 1. *Section of a mature plant.* Fig. 2. *Sporules magnified.*

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PUCCINIA HERACLEI.

Cow-Parsnip Puccinia.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.* EPIPHYTÆ, *Link.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Peridium verum 0. *Sporidia uni aut multiloculata, pedicellata, pedicello fixa, et in cæspitulis aggregata, foliis vivis parasiticis. Epidermis foliorum peridio simillima.*

True peridium 0. Sporidia, one or many-celled, pedicellated, fixed by the pedicel, and growing in minute clusters or tufts on living leaves. The epidermis bearing a strong resemblance to a peridium.

SPECIFIC CHARACTER.

PUCCINIA Heraclei; *hypophylla, nigrescens, epidermide ferrugineo cincta; sporidia congesta, obtusissima subovata biloculata; stipite brevissima.*

P. hypophyllous, blackish, surrounded by the ferruginous epidermis; sporidia crowded, very obtuse, subovate, 2-celled; stem very short.

PUCCINIA Heraclei, *Grev. Fl. Edin. ined.*

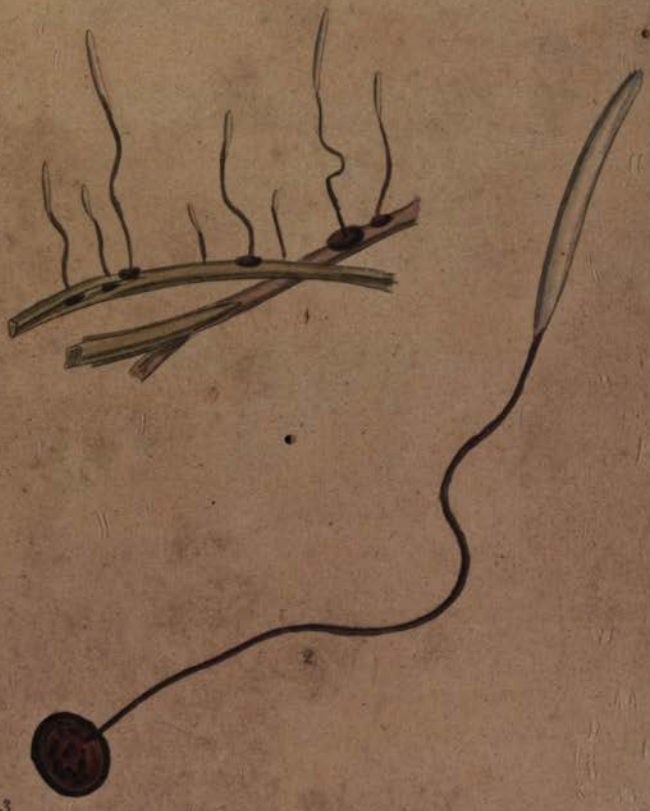
HAB. On the leaves, and sometimes on the petiolets of the leaves of *Heraclium sphondylium*, not rare. Summer. Very abundant in 1822 near Kirkaldy.

Form somewhat irregular, roundish, scattered, never confluent, depressed, girt by the remains of the ruptured epidermis, which is of a reddish colour. When it occurs on the petiols, the figure is subelliptical. *Sporidia* 2-celled, the upper and lower cells nearly equal, very obtuse, the latter terminating suddenly in a very minute stem.

This species approaches very near to *P. umbelliferarum* of DE CANDOLLE, which I have detected in this country on *Myrrhis odorata*, *Pimpinella saxifraga*, and *Chærophyllum sylvestre*. *P. Heraclei* differs in being much larger, more depressed, and surrounded by the epidermis, which is very fugacious in the other.

The different form which the plant assumes, when growing on the petiols, arises solely from the more elongated structure of that part.

Fig. 1. *Plants, nat. size, both on the leaf and petiol.* Fig. 2. *A single cluster.*
Fig. 3. *Sporidia;—the two last magnified.*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PHACORIZA ERYTHROPUS.

Pink-stemmed Phacoriza.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Juss.* &c.

GENERIC CHARACTER.

Hymenium clavatum vel filiforme cum stipite plerumque plus minusve confluens. Stipes tuberculo radiculi insidens.

Hymenium (fructifying surface) club-shaped or filiform, generally more or less confluent with the stem, which arises from a small radicular tuber.

SPECIFIC CHARACTER.

PHACORHIZA erythropus; *minuta, gregaria; hymenio lævi, albo, lineari; stipite elongato, filiformi, rubente, et tuberculi centro insidente.*

P. minute, gregarious; hymenium smooth, white, linear; stem elongated filiform, red, arising from the centre of a small tuber.

PHACORHIZA erythropus, *Grev. Fl. Edin. ined.*

CLAVARIA erythropus, *Pers. Comment.* p. 84.—*Syn. Fung.* p. 606.—*Mycol. Europ.* v. 1. p. 191.—*Alb. et Schw.* p. 293.—*De Cand. Fl. Franç.* v. 6. p. 28.—*Gray's Nat. Arr.* v. 1. p. 658.

CLAVARIA gyrans, *Bolt. Fung.* t. 112.—*With. Bot. Arr.* ed. 6. v. 4. p. 430.—*Purt. Midl. Fl.* v. 2. p. 694. et v. 3. p. 471.—*Relh. Fl. Cant.* ed. 3. p. 562.

TYPHULA erythropus, *Fries, Obs. Mycol.* v. 2. p. 297.—*Syst. Mycol.* v. 1. p. 495.

HAB. In woods and shady places, on dead leaves, sticks, and straws, often with the tuber within the hollow of the latter. Woods at Balmuto; in the autumn.

Whole *plant* never more than an inch high, often not more than half, gregarious. *Hymenium* smooth, white, linear or linear-oblong, about one-third of the height of the plant. *Stem* erect, often flexuose, filiform, much finer than the hymenium, but passing suddenly into it, pink-red, arising from the centre of a small, circular, depressed, but convex tuber, which is often concealed within the sheaths or culms of dead grasses. The tuber is dark-brown, somewhat rugose, and little more than a line in diameter.

PERSOON, in the first part of his *Mycologia Europæa*, has instituted a new genus, under the name of *Phacorhiza*, of a plant very nearly allied to *Clavaria*, discovered by Dr

MOUGEOT. Its principal distinction resides in the tuber, at the base, which is said at first to inclose the clavate hymenium, and at length to protrude it. His character of the species is,

PHA. Sclerotioides, *sparsa; clavula simplice alba, tuberculo badio.*

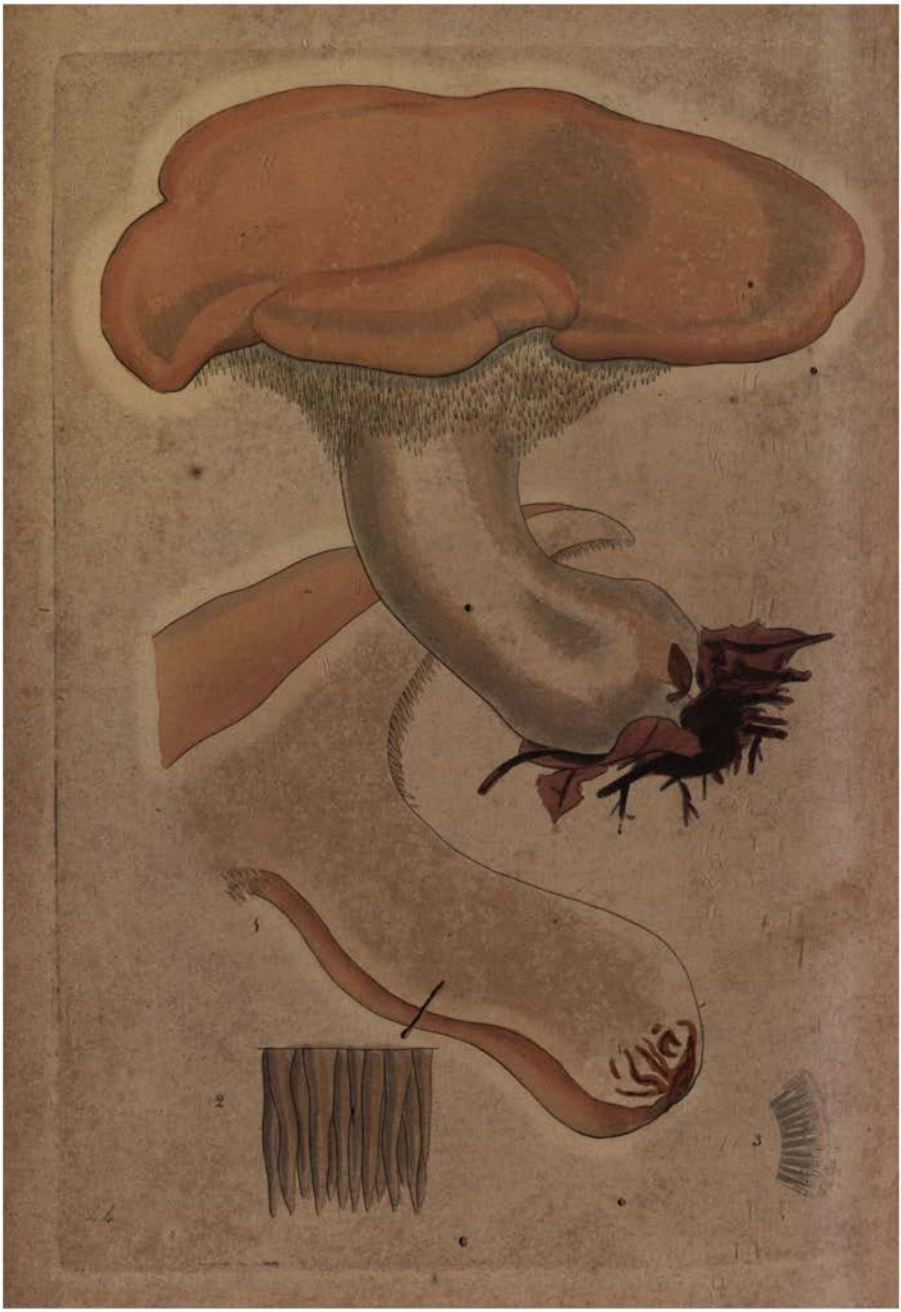
He observes, that it must not be confounded with *Clavaria Sclerotioides* of DE CANDOLLE, the hymenium of which, he adds, is a continuation of the tuber, and of the same colour. I cannot help suspecting, that the two plants are nevertheless the same; for, according to DE CANDOLLE's account, the hymenium was reddish when dried, but appeared to have been white when recent. The size is in both the same, that of 2–3 lines in length. The form also exactly agrees; and the habitat too remarkable in coincidence to be overlooked. Dr MOUGEOT found his specimens on the dried stems of *Sonchus alpinus* and *Cacalia albifrons*. M. CHAILLET found those which DE CANDOLLE examined, on the dried stems of *Gentiana lutea*. The circumstances of the clavate hymenium being protruded from the tuber, is scarcely yet sufficient to be a generic character, as other nearly allied plants have been said to do the same, especially *Clavaria Phacorhiza*, which is so figured and described by SOWERBY.

Proceeding upon the above grounds, I have extended PERSOON's new genus, and included all those *Clavariæ* which have so singular a character as the *radicular tuber*,—surely a more striking distinction than a slight variation in the form of the *hymenium*. The fructification is similar in the whole.

FRIES has formed several genera of *Clavaria*, on which future observations will be made. His *Typhula* and *Pistillaria* contain plants which I consider as coming more naturally under *Phacorhiza*.

Clavaria capillaris (*Typhula villosa*, FRIES), referred by most authors to our plant, is certainly different, having a hairy stem, whence the name *villosa* given by SCHUMACHER. Of this plant HOLMSKIOLD has an excellent figure.

Fig. 1. *Plants, nat. size.* Fig. 2. *A plant magnified.*



HYDNUM REPANDUM.

Flesh-coloured Hydnum.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *FUNGI, Link. Grev.*

GENERIC CHARACTER.

Hymenium aculeatum. Aculei vel processi subulati liberi carnosi sporuliferi.

Hymenium spinose. Spines or awl-shaped processes, free, carnose, sporule-bearing.

SPECIFIC CHARACTER.

Hydnum repandum; *pileo carnoso, lævi, subrepando, incarnato-pallido; aculeis inæqualibus pallidis; stipite pallido difformi.*

H. pileus fleshy, smooth, unequally spreading, pale flesh-colour; spinous processes unequal, pale; the stem very pale, irregular in form.

Hydnum repandum, *Linn. Fl. Suec.* 1258.—*Sp. Pl.* 1467.—*Fl. Dan.* t. 310.—*Bull. Champ.* p. 311. t. 172.—*Sow. Fung.* t. 176.—*Bolt. Fung.* t. 89.—*Sibth. Fl. Oxon.* 1072.—*Huds. Fl. Angl.* v. 2. p. 628.—*Lightf. Fl. Scot.* p. 1041.—*With. Bot. Arr.* ed. 6. v. 4. p. 403.—*Relh. Fl. Cantab.* ed. 3. p. 550.—*Pers. Obs. Mycol.* 2. p. 96.—*Syn. Fung.* p. 555.—*Scop. Fl. Carn.* No. 1599.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 111.—*Ejusd. Syn.* p. 22.—*Alb. et Schw.* p. 265.—*Merat, Fl. des Environs de Paris,* v. 1. p. 38.—*Pers. Traité,* p. 247.—*Purt. Midl. Fl.* v. 2. p. 677.—*Fries, Obs. Mycol.* 1. p. 138.—*Syst. Mycol.* v. 1. p 400.—*Hook. Fl. Scot.* Pt. 2. p. 28.——*Grev. Fl. Edin. ined.*

Hydnum rufescens, *Schæff. Fung.* t. 141.

Hydnum flavidum, *Schæff. loc. cit.* t. 318.

Hydnum carnosum, *Batsch. Elench. Fung.* t. 26. f. 136.

Hydnum clandestinum, *Batsch. loc. cit.* t. 10. f. 44.

Hydnum medium, *Pers. Ob. Mycol.* 2. p. 97.

Dentinum repandum, *Gray's Nat. Arr.* v. 1. p. 650.

Fungus erinaceus, *Vaill. Par.* t. 14. f. 6, 7, 8.

Erinaceus esculentus pallidè luteus, *Mich. Nov. Gen.* p. 132. t. 72. f. 3.

Hab. Woods; very generally diffused through Great Britain, and pretty common, in the autumn.

Pileus 2–4 inches broad, more or less convex, sometimes slightly depressed, smooth, brittle, carnose, waved or sinuous, or even sublobed at the margin, spreading, very pale buff flesh colour, occasionally reddish. *Hymenium* composed of fleshy, unequal, conical spines, about the eighth of an inch in length, very pale, mostly entire at the apex, but sometimes laci-

niate, and as if tubular. *Stem* often not central, thick, but unequal, rarely straight, 1½–3 inches in length, solid, fleshy, paler than the pileus. Plants seldom solitary, yet scarcely gregarious.

A variable plant, but not liable to be confounded with any other, if the above character and description be attended to. Its nearest affinity is with *H. candidum*, which, however, is well marked by its very white colour, and short, diaphanous, scattered spines of the hymenium. FRIES has kept *Hyd. rufescens* of PERSOON distinct: it is said to be minutely downy, and the pileus *subtiliter zonatus;* which certainly implies some distinction. I am, however, by no means convinced of its specific difference, especially as BOLTON's figure of *Hyd. imbricatum* (t. 88.) is quoted. FRIES indeed observes *prioris varietas insignior.*

Hyd. repandum is much used on the Continent as food. It is regularly sold in Austria. In France it has the provincial names of *Eurchon, Rignoche* and *Arresteron.* In the Vosges, it is called *Barbe de vache* and *Pied de mouton.* When prepared for the table, it is commonly broiled with fresh butter, pepper and salt, and fine herbs. M. PAULET, however, says it is better to plunge it it into boiling water, and, without draining, dress it *à la graisse et au bouillon.* With butter alone, it is rather tough, and it requires a more liquid vehicle, as it has but little juice of its own.

Fig. 1. *A section of a mature plant.* Fig. 2. *Spinous processes of the hymenium.* Fig. 3. *Sporuliferous cells and sporules;—the two last magnified.*

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CRYPTOSPHÆRIA Tamariscinis.

Tamarix Cryptosphæria.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *HYPOXYLA*, *De Cand. Grev.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Receptaculum 0. *Sphærulæ duriusculæ, sparsæ vel aggregatæ, sub epidermide insidentes, ore nunc depresso nunc elongato, quandoque nullo; intùs massa gelatinosâ sporulifera instructæ.*

Receptacle 0. Spherules corneous, scattered or aggregate, lying beneath the epidermis, with the mouth depressed, elongated or wanting, containing a gelatinous sporuliferous mass.

SPECIFIC CHARACTER.

Cryptosphæria Tamariscinis; *sparsa, sub ramulorum epidermide, valde convexa, centro rupta, ostiolo brevissimo, non exserto. Sporulæ in cellulis filiformibus.*

C. scattered, under the epidermis of the branches, very convex, and ruptured in the centre; the orifice very short, concealed. Sporules contained in filiform cells.

Cryptosphæria Tamariscinis, *Grev. Fl. Edin. ined.*

Hab. On the dead branches of *Tamarix germanica*, in the garden of David Falconer, Esq. Carlowrie. Autumn and Winter.

Spherules scattered, gregarious, roundish, slightly depressed, the spherules giving a dark hue to the very convex epidermis, which is ruptured, but not raised in the centre. *Orifice* very short, obtuse, not exserted. *Sporules* yellow, contained in filiform hyaline cells; the latter intermixed with other filaments.

A neat looking species, answering extremely well to the generic character, being indeed only visible by the dark and convex minute portion of the epidermis. The generic character is here amended, for I have found that the sporules are not invariably naked, and have stated, under *Sphæria verrucosa*

(t. 39.), the necessity of adding several of the *Astomæ* of Mr GRAY, the want of an orifice not being of itself sufficient to keep them distinct, were that character even constant, which it is not.

Fig. 1. *Plants, nat. size.* Fig. 2. *Plants, and sections of ditto in situ.* Fig. 3. *A spherule divided and removed.* Fig. 4. *Sporuliferous cells.*

MERISMA FŒTIDUM.

Fœtid Merisma.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *FUNGI, Juss.* &c.

GENERIC CHARACTER.

Plantæ subcrustaceæ vel substipitatæ, ramosæ, coriaceæ, ramis semper complanatis, dilatatis, laciniatis. Hymenium omnem fere superficiem utrimque occupans, cum stipite valde confusum.

Plants somewhat crustaceous or substipitate, branched, coriaceous: branches always compressed, dilated, laciniate. Hymenium covering almost the whole surface on every side, and passing insensibly into the stem.

SPECIFIC CHARACTER.

Merisma fœtidum; *erectum, cæspitosum, fusco-purpurascens, ramis complanatis, dilatatis, palmatis, apice albicantibus.*

M. erect, tufted, purplish-brown, the branches compressed, dilated, palmate, with the apex whitish.

Merisma fœtidum, *Pers. Comment.* p. 92.—*Syn. Fung.* p. 584.—*Albert. et Schw.* p. 284.—*Schm. et Kuntz, Pl. Exs.* N. 96.—*Gray's Nat. Arr.* v. 1. p. 654.—*Grev. Fl. Edin. ined.*

Merisma palmatum, *Pers. Mycol. Europ.* v. 1. p. 157.

Merisma flabellare, *Pers. Comment.* p. 93.—*Syn.* p. 584.?

Clavaria palmata, *Scop. Fl. Carniol.* 2. p. 483.—*Nees, Syst.* t. 66. f. 151.

Clavaria anthocephala, *Bull. Champ.* p. 197. t. 452. f. 1.—*Sow. Fung.* t. 156.—*With. Bot. Arr.* ed. 6. v. 4. p. 437.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 102.—*Ejusd. Syn.* p. 21.—*Relh. Fl. Cantab.* ed. 3. p. 563.—*Sibth. Fl. Oxon.* p. 366.—*Purt. Mid. Fl.* v. 2. p. 697. et 3. p. 474.

Clavaria flabellaris, *Batsch, Elench. Fung. Cont.* 1. p. 227. t. 28. f. 159.

Ramaria palmata, *Holmsk. Coryph.* v. 1. with a fig.

Thelephora palmata, *Fries, Syst. Mycol.* v. 1. p. 432.

Thelephora flabellaris, *Fries, loc. cit.* p. 433.?

Hab. On the ground in woods, Autumn. Near Glasgow, Mr Rennie. Balmuto. In England, it has been found by various botanists; as by Sowerby in Hainault Forest,—by Rehlan in Madingly Wood,—by Sibthorpe in Shotover Plantations,—and by Mr Purton in a similar locality at Arrow.

Tufted, often gregarious, varying in size from half an inch to above four inches in height, and from a single stem to a dense mass two or three inches in thickness; erect, robust at the base, much branched; the branches coriaceous, flat, plicate, dilated upwards, palmate, more or less laciniate, and whitish at the apex. The colour of the rest of the plant

is a rusty purplish-brown, and the surface invested with a minute pubescence. The *hymenium* covers the whole surface, and passes insensibly into the stem near the base. *Sporules* globose, contained in filiform, tubular, hyaline cells. Plant insupportably fœtid soon after gathering.—Some varieties are much smaller, less tufted, and have their branches more plane, less divided, and less palmate, with the odour not so fœtid.

If this plant be not recognised by its purple-brown colour, and coriaceous substance, its abominable smell, a short time after it has been committed to the vasculum, will speak for itself; and if placed too early in the herbarium, the naturalist will not fail to have his memory frequently refreshed, about this peculiarity at least; for it not only retains its odour, but freely imparts it to the papers in its neighbourhood.

The ingenious and learned FRIES has added *Merisma* to *Thelephora*, in which it forms his third section. Although it must be allowed that some species approach very near to *Thelephora*, I cannot admit of such a junction: the latter genus is already made up of plants agreeing little with each other in habit, and is so numerous as to count in FRIES 76, and in PERSOON's Mycologia 110 species. Independently of other characters, *Merisma* seems to be well defined, by having its hymenium on both surfaces when decumbent, and on every side when erect. I am not indeed prepared to assert, that some few *Thelephoræ* may not also participate in this peculiarity; but I suspect not, as as it has never been attributed to even a single species. At any rate, this would form a natural boundary between the two genera; and perhaps, by proceeding on this principle, *Merisma* might lose with advantage two or three species.

Fig. 1. *Plant, nat. size.* Fig. 2. *A portion of a branch magnified.* Fig. 3. *Sporuliferous cells, with sporules, ditto.*

47

SPHÆRIA AUREA.

Gold-coloured Sphæria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. ***HYPOXYLA***, *De Cand. Grev.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Receptaculum 0. *Sphærulæ corneæ, liberæ, sessiles aut subimmersæ, sparsæ vel congestæ, ore interdum elongato, aliquando nullo; intùs gelatinosæ, sporulis in tubis filiformibus nidulantibus.*

Receptacle 0. Spherules free, corneous, sessile or subimmersed, scattered or crowded, mouth sometimes elongated, sometimes wanting; interior filled with a gelatinous mass, in which are numerous filiform tubes containing sporules.

SPECIFIC CHARACTER.

SPHÆRIA aurea; *effusa, gregaria, valde congesta, sphærulis subastomis, ovatis, subacuminatis; tubis sporuliferis filiformibus, elongatis.*

Sph. gregarious, spreading, very crowded, the spherules nearly mouthless, ovate, somewhat acuminate: sporuliferous tubes, filiform, elongated.

SPHÆRIA aurea, *Grev. Fl. Edin. ined.*

HAB. On some of the larger fungi when in a semiputrid state. The specimen figured was growing on the pileus of *Polyporus squamosus* in Newliston woods, and found by Captain WAUCH and myself, September. 1822.

Spherules minute, occurring in irregular patches sometimes above an inch long, excessively crowded, in undulating masses; orange or gold coloured, ovate, some obtuse, others pointed, between gelatinous and corneous, without a visible orifice, but discharging the sporules in the form of little tendrils. *Sporules* roundish, contained in long filiform, hyaline tubes; 3–5 in each.

A very striking and handsome little Sphæria, bearing no affinity to any other species that I am acquainted with. Remarkable for its place of growth, and in its colour, there is no danger of its being mistaken for any other plant.

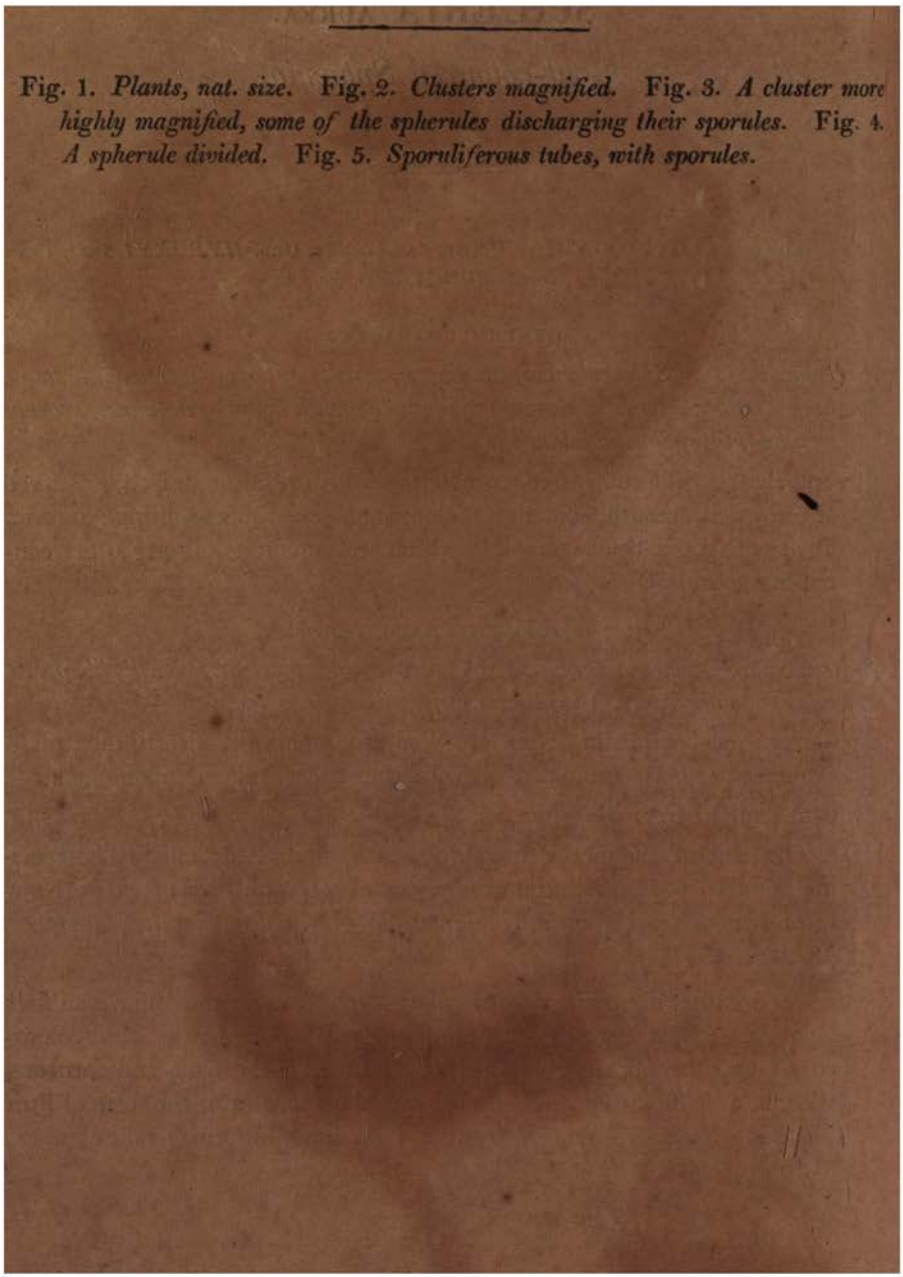

Fig. 1. *Plants, nat. size.* Fig. 2. *Clusters magnified.* Fig. 3. *A cluster more highly magnified, some of the spherules discharging their sporules.* Fig. 4. *A spherule divided.* Fig. 5. *Sporuliferous tubes, with sporules.*

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SCLERODERMA VERRUCOSUM.

Warty false Puff-ball.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Link, Grev.*—FUNGI, *Juss.* &c.

GENERIC CHARACTER.

Plantæ globosæ sæpe stipitatæ. Peridium simplex, durum, verrucosum. Sphærulæ in glomerulos coacervatæ, floccis inspersæ.

Globose plants, often furnished with a stem. Peridium simple, hard, warty. Sporules collected into little roundish masses, and intermixed with small woolly filaments.

SPECIFIC CHARACTER.

SCLERODERMA verrucosum; *gregarium, flavo-rufescens, stipite submagno, basi dilatato lacunoso; peridio apice dehiscente.*

S. gregarious, yellowish-brown, with a large lacunose stem thickened at the base; peridium bursting at the apex.

SCLERODERMA verrucosum, *Pers. Syn. Fung.* p. 154.—*Gray's Nat. Arr.* v. 1. p. 582.—*Grev. Fl. Edin. ined.*

LYCOPERDON verrucosum, *Bull. Champ.* p. 157. t. 24.—*De Cand. Fl. Franç.* v. 2. p. 265.—*With. Bot. Arr.* ed. 6. v. 4. p. 451.

LYCOPERDON defossum, *Sow. Fung.* t. 311.—*Batsch, Elench. Fung. Cont.* 2. p. 126. t. 42. f. 229.—*With. loc. cit.* p. 455.—*Purt. Midl. Fl.* v. 2. p. 701.??

LYCOPERDON verrucosum, sphæricum pedunculo donatum, e flavo-rufescens, punctulis fuscis adspersum, *Vaill. Bot. Par.* p. 122. t. 16. f. 7, 8.

LYCOPERDASTRUM obscurum, altius radicatum, pulpa atro-purpurea cute lacera, et in furfurem veluti soluta, *Mich. Nov. Pl. Gen.* p. 219. t. 99. f. 3.

HAB. In woods and borders of fields among grass. Autumn. Abercorn Park, near the entrance from Duddingston. In England, it has been found at Edgebaston by WITHERING, and elsewhere by others; but correct habitats are not stated.

A large species 2–4 inches in diameter, and 2–6 inches high, including the root; globose, but somewhat depressed, and of a rich yellow or reddish brown colour. *Peridium* thick, coriaceous, varying much in the degree of scaliness or wartiness with which it is covered; generally, the warts are small and dark-coloured, rarely nearly wanting. It bursts at the apex with an irregular orifice, the segments of which are often somewhat revolute and rigid. *Sporules* purplish-brown, very numerous, intermixed with filaments: if a plant be torn asunder a little before maturity,

they are very distinctly conglobated or collected into little masses, which, from being divided when a knife is used, give a darker colour to the interior than when it is torn. *Stipes* irregularly pitted, and very unequal in length, terminating in a large mass of roots, variously divided, and partly concealed beneath the ground.

The remarkably coriaceous, rigid peridium, pitted stem, and large root, render this species sufficiently conspicuous and intelligible. We therefore find, that less confusion attaches to this than most other plants of the section to which it belongs. Some mistakes nevertheless appear to have arisen, from PERSOON having attempted to identify the *Lycoperdon defossum* of BATSCH with his *Scleroderma citrinum*, and in SOWERBY considering his *Lyc. defossum*, as synonymous with *Lyc. spadiceum* of SCHŒFFER. Mr GRAY has followed PERSOON in referring BATSCH's plant to *Scl. citrinum*, but has very properly corrected SOWERBY's error, and removed *Lyc. spadiceum*.

From the figure and very minute description given by BATSCH, I have no doubt his is a variety of our plant. WITHERING has indeed brought his and SOWERBY's plant together; but then he has retained *Lyc. verrucosum* as a distinct species, between which and *Lyc. defossum* of SOWERBY there can be no dispute.

PERSOON has a remark, that *Lycoperdon spadiceum* is probably a mere variety of *Lyc. citrinum:* in this I am half inclined to acquiesce; but not having seen all the varieties, dare not at present venture to decide.

Mr PURTON has added *Tuber solidum* of WITHERING as a synonym to *Lyc. defossum* of SOWERBY, which makes me doubtful whether he has seen the true plant. *Tuber solidum* of WITHERING is *Scleroderma cepa* of authors, and a very distinct species.

Fig. 1. *A plant about half-grown.* Fig. 2. *A mature plant, recently ruptured.* Fig. 3. *A plant torn asunder, and scarcely mature.* Fig. 4. *Filaments and sporules.*

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CLAVARIA TRICHOPUS.

Hairy-stemmed Clavaria.

Class and Order CRYPTOGAMIA FUNGI, *Linn.*—Nat. Ord. *FUNGI, Juss.* &c.

GENERIC CHARACTER.

Plantæ carnosæ, plus minusve cylindraceæ, simplices vel ramosæ. Hymenium lævе, omnem fere superficiem occupans, cum stipite confluens. Sporulæ albidæ vel ochraceæ.

Carnose plants, more or less cylindrical, simple or branched. Hymenium smooth, occupying almost the whole surface, and confluent with the stem. Sporules white or ochraceous.

SPECIFIC CHARACTER.

Clavaria trichopus; *minuta, alba; hymenium breve, clavatum, stipite elongato filiformi hirsuto.*

Cl. minute, white; hymenium short, clavate; stem elongated, filiform, hairy.

Clavaria trichopus, *Grev. Fl. Edin ined.*

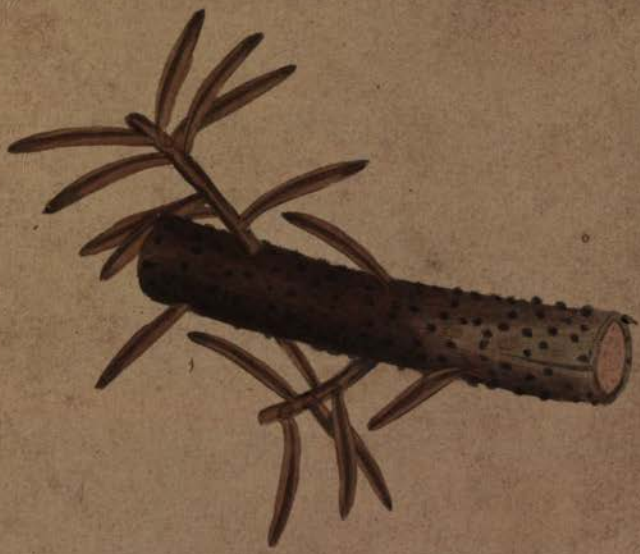
Hab. On sticks, straws, dead leaves, &c. in damp woods. Balmuto.

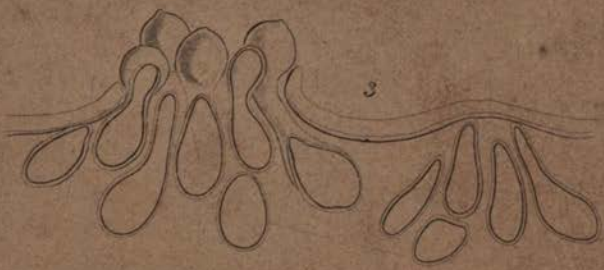
Whole plant scarcely a quarter of an inch high, very delicate, white. *Hymenium* about one-third of the length of the entire plant, ovate, oblong or cuneiform, smooth. *Stipes* very slender, equal, hairy.

This minute addition to an extensive genus, is fortunately well marked by its hairy stipes; and there are, besides, very few to which it approaches in other characters, especially in the short, obtuse, and incrassated hymenium.

It was with no small pleasure that I accidentally perceived this little novelty, growing intermixed with two other by no means common plants, *Phacorhiza filiformis* and *Ph. erythropus* (*Clavariæ Phacorhiza* and *erythropus* of authors). Many interesting plants have been discovered in a similar manner; and it is a proof that much is to be done in our moist woods, which, I am convinced, are full of mycological treasures, and would yield a rich harvest to the cryptogamist.

Fig. 1. *Plants, nat. size.* Fig. 2. *The same magnified.*





CUCURBITARIA PINASTRI.

Fir-branch Cucurbitaria.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA, De Cand. Grev.*—FUNGI, *Juss. &c.*

GENERIC CHARACTER.

Sphærulæ corneæ, cæspitosæ, liberæ, receptaculo insidentes, raro primo inclusæ: intùs, massa gelatinosa sporulifera repletæ.

Spherules corneous, tufted, free, fixed on a receptacle, sometimes at first included: interior filled with a gelatinous sporuliferous mass.

SPECIFIC CHARACTER.

CUCURBITARIA pinastri; *cæspitosa, sphærulis globosis, punctatis, rubris, demum nigrescentibus, primò receptaculo immersis; sporulis in tubis utrimque attenuatis.*

C. clustered, the spherules globose, dotted, red, at length becoming blackish, immersed at first in the receptacle; sporules contained in tubes which are attenuated at each extremity.

CUCURBITARIA pinastri, *Grev. Fl. Edin. ined.*

HAB. On the smaller branches of Fir trees, especially *Pinus Abies*. Rosslyn Woods. Autumn.

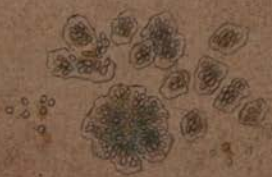
Receptacle of no regular form, blackish, scarcely corneous, elevating the bark, which is at length ruptured by the evolution of the *spherules*, which are at first included in the receptacle, but having pierced its surface, assume a globular form, and appear as if merely seated on that body; others coming forward to maturity, push aside those which preceded them, and thus irregular clusters are produced. The surface is dotted, and the colour varies from dull red to nearly black, according to age. The mouth is very small, and gently mamillose. *Sporules* oblong, contained in a gelatinous mass of filiform tubes attenuated at each extremity; about 3 in each.

CUCURBITARIA is a genus recently proposed by Mr GRAY, of which *Sphæria cucurbitula* of TODE seems to have afforded the type. It contains most of the species constituting the seventh section of *Sphæria* in PERSOON's System, and which have a peculiarity and uniformity of character well deserving of even generic distinction.

In regard to the present plant, I suspect TODE intended to describe it as the variety β *nigrescens* of his *Sphæria cucurbitula*, which PERSOON afterwards made a species in the first part of his *Observationes Mycologicæ*, p. 65., and in his *Synopsis Fungorum*, p. 53. Their characters, if my supposition be correct, are however so erroneous, that few would be able to trace the connection. I shall quote PERSOON's character: "*Cæspitosa nigra, sphærulis astomis, nigris, collapsis, subrugosis.*" In all the specimens which I have examined, the spherules have a minute orifice, and a distinct mamillose projection. They are of a fine rich dull red colour, till they decay, and then, indeed, they are black. Another considerable discrepancy is also to be observed in TODE's figure; and in PERSOON's description, the spherules are said to be placed upon the receptacle, "*stroma* cui impositæ sphærulæ," &c. whereas in our plant, they originate from within the receptacle, and a portion always continues to remain beneath its surface. In consequence of the above uncertainty, I have preferred considering our plant as new, whereby additional confusion is avoided.

When it occurs, it is in great abundance, frequently covering the smaller branches for many feet, at intervals often not exceeding the eighth of an inch.

Fig. 1. *Plants, nat. size.* Fig. 2. *Clusters and spherules, magnified.* Fig. 3. *A section, the receptacle and spherules showing their progress to the surface.* Fig. 4. *Sporuliferous cells and sporules.*



PALMELLA ROSEA.

Rose-coloured Palmella.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *CHÆTOPHOROIDEÆ, Grev.*—FUNGI, *Pers.*—LICHENES, *Schreb.*

GENERIC CHARACTER.

Massa gelatinosa, varia, subhyalina, granulis solitariis, globosis, sparsis vel subcongestis, farcta.

A various, gelatinous, somewhat hyaline mass, filled with solitary, globose, scattered or subconglomerate granules.

SPECIFIC CHARACTER.

PALMELLA rosea; *minuta, subhemisphærica, carnosa, mollis, rosea, granulis internis, minutissimis.*

P. minute, subhemispherical, carnose, soft, rose coloured, containing extremely minute granules.

PALMELLA rosea, *Lyngb. Tent. Hydroph. Dan.* p. 207.—*Grev. Fl. Edin. ined.*

LICHEN roseus, *Schreb. Fl. Lips.* No. 1150.—*Fl. Dan.* t. 1243. f. 1. *fide Lyngbye.*

LEPRA rosea, *Willd. Fl. Berol.* No. 1072.

LEPRA carnea, *Ehrh. Pl. Crypt. Exsicc.* Dec. 31. No. 308. *fide Pers.*

TUBERCULARIA rosea, *Pers. Syn. Fung.* p. 114.—*Obs. Mycol.* 1. p. 78.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 276.—*Ejusd. Syn.* p. 58.—*Alb. et Schw. Conspect. Fung.* p. 69.

SCLEROTIUM persicolor, *Schum. Pl. Sælland.* 2. p. 180.

HAB. Chiefly on Parmelia stellaris and Borrera tenella, but also on other Lichens, whether on trees or stones; sometimes even on the naked bark of the tree. Autumn, winter and spring. Breadalbane, Mr MACINTOSH. Above Burntisland, on the stone-walls. Not unfrequent in the Highlands.

A minute plant, varying in size from a pin's head to a small pea, roundish or hemispherical, but with an irregular surface, solitary, or several crowded together, very soft and fragile, falling away instantly on being put into water. The colour much resembles a mixture of raspberries and cream, paler within. *Granules* very minute, apparently not equally distributed throughout the whole mass, but collected into small clusters, and enclosed in roundish, gelatinous, transparent bodies.

Palmella is a very curious genus established by LYNGBYE, in his excellent work on Danish Algæ, and contains, according to him, nine species, some of which had never before found a permanent resting-place. Among the latter may be included our present species, and another, native of this country, which I shall soon publish, P. *botryoides;* called a *Tremella* by SCHREBER, a *Byssus* by LINNÆUS, a *Lichen* by ACHARIUS, and a *Nostoc* by AGARDH.

P. *rosea* is by no means uncommon in this country, but has probably been frequently overlooked for an animal production; and in truth, it has at the first glance so little claim to the name of a vegetable, that such an oversight is excusable. I have not been able to discover any general covering, however delicate, in which it differs from most others of the genus, and when moistened with water, it dissolves in a rapid and extraordinary manner.

Almost immediately after I had found this plant about Edinburgh, I received several specimens from Mr MACINTOSH, which he discovered chiefly on the trunks of trees in Breadalbane.

Fig. 1. *Plants, nat. size.* Fig. 2. *Ditto, magnified.* Fig. 3. *Granules, and the minute hyaline masses in which they seem to be enclosed.*

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PHACIDIUM CORONATUM.

Coronet-shaped Phacidium.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *HYPOXYLA*, *De Cand. Grev.*

GENERIC CHARACTER.

Peridia sessilia, varia, cornea, primum clausa, dein a centro versus ambitum, in lacinias plures, dehiscentia. Cellulæ sporuliferæ, fixæ, erectæ, elongatæ, sporulis ovolibus.

Peridia sessile, various, closed, at length bursting from the centre towards the circumference, in numerous segments. Sporuliferous cells fixed, erect, elongated. Sporules oval.

SPECIFIC CHARACTER.

PHACIDIUM coronatum; *orbiculare, subhemisphærico-depressum, nigrum, peridio in lacinias acutas plures dehiscente; disco pallide flavescenti.*

Ph. orbicular, subhemispherical, depressed, black; peridium dehiscent in numerous acute segments; disk pale yellowish.

PHACIDIUM coronatum, *Fries, Obs. Mycol.* 1. p. 167.—*Ditm. in Sturm's Deutschl. Fung.* t. 63.—*Kunze et Schm. Mykol. Hefte*, p. 36., *et Deutschl. Schwäm.* 4. No. 82.—*Grev. Fl. Edin. ined.*

ASCOBOLUS coronatus, *Schum. Sælland.* v. 2. p. 437.

XYLOMA pezizoides, *Pers. Syn. Fung.* p. 105.—*Ejusd. Icon. Pict. Fung. Rar. Fasc.* 3. t. 18. f. 1.—*Alb. et Schw. Conspect. Fung.* p. 66.—*Gray's Nat. Arr.* v. 1. p. 546.—*De Cand. Fl. Franç.* v. 6. p. 160.

PEZIZA comitialis, *Batsch, Elench. Fung. Cont.* 1. p. 217. t. 27. f. 152.—*Sow. Fung.* t. 118.—*Relh. Fl. Cantab.* ed. 3. p. 559.

PEZIZA viridis, *Bolt. Fung.* t. 109. f. 1. (*not of Withering*).

PEZIZA Artocreas, *Rebent. Ind. Pl.* p. 45. *fide Kunze et Schm.*

SCLEROTIUM quercinum, *Fl. Dan.* t. 1380. *fide Fries.*

HAB. On dead Oak and Beech leaves in woods; spring and autumn. Banks of Loch Lomond, in many places. Woods at Kinordy. Balmuto. Abercorn Park.—In England, it has been only found, to the best of my knowledge, by REHLAN in Madingly wood, and by BOLTON near Halifax.

This plant, while young, exactly resembles a small circular black xyloma, and is at first but little raised above the surface of the leaf. It is then smooth and shining. By degrees it becomes slightly rugose, raised, in a hemispherical manner, but somewhat depressed, and at length bursts in the centre, and splits into a number of acute, subtriangular laciniæ, which become elevated, and slightly bent back, so as to resemble a beautiful coronet in miniature. This state is seen to most advantage in moist wea-

ther: when exposed to warmth, the segments close. *Colour* of the disk, varies from very pale yellow to yellowish-green. Sporuliferous cells, hyaline, elongate, thicker upwards, obtuse.

A very elegant little plant, which, though easy to understand, has, from being examined in different states, and with different powers of the microscope, perplexed various authors. It is difficult to say by whom it was first noticed, as BOLTON found it in 1785, and BATSCH published it in 1786. Both referred it to *Peziza*. PERSOON removed it to *Xyloma*, to which it bears considerable apparent affinity; and FRIES lastly gave it a place in his genus *Phacidium*, which appears to be generally approved. Of this genus KUNZE and SCHMIDT in their excellent "Mykologische Hefte nebst einem allgemein-botanischen Anzeiger," have given an able monograph. DITMAR has also given a good figure and description of our species in STURM's Deutschlands Flora, but appears to have taken his magnified representation from a specimen whose segments of the peridium had been injured.

In this country, as well as in France and Germany, it seems to grow on beech and oak leaves indifferently; and though DE CANDOLLE has made two varieties, from their growing on the different leaves, I have never been able to detect the least difference.

From the description given by WITHERING, and from his reference to BULLIARD, it is very clear he never saw the true plant; and though BOLTON is cited, SOWERBY's more recent figure and correct synonym of BATSCH is altogether neglected.

Fig. 1. *Plants, nat. size.* Fig. 2. *A plant removed, and its progress to maturity exhibited; one of them divided.* Fig. 3. *Sporuliferous cells, with sporules.*

CHÆTOPHORA MARINA.

Marine Chætophora.

CLASS AND ORDER CRYPTOGAMIA ALGÆ, *Linn.*—NAT. ORD. *CHÆTOPHOROIDEÆ, Grev.*—ALGÆ, *Juss.* &c.

GENERIC CHARACTER.

Massa gelatinosa, elongata vel globosa, filis ramosis articulatis, farcta.—(Lyngb.)

A gelatinous, elongated or roundish mass, filled with branched articulated filaments.

SPECIFIC CHARACTER.

CHÆTOPHORA marina; *massa globosa, subcoriacea, cava; filis intra substantiam densissimis, dichotomo-ramosis; ramis fastigiatis, apice clavatis.*—(Lyngb.)

Ch. mass globose, hollow, somewhat coriaceous; filaments densely arranged in the substance of the plant, branched dichotomously; branches fastigiate and clavate at the apex.

CHÆTOPHORA marina, *Lyngb. Tent.* p. 193. t. 66. f. A.—*Grev. Fl. Edin. ined.*

NOSTOC marinum, *Ag. Disp.* p. 45.—*Syn.* p. 133.

TREMELLA difformis, *Linn. Sp. Pl.* 1626.—*Huds. Fl. Ang.* v. 2. p. 565.—*With. Bot. Arr.* ed. 6. v. 4. p. 97.

RIVULARIA tuberiformis, *Eng. Bot.* t. 1956.

LEATHESIA tuberiformis, *Gray's Nat. Arr.* v. 1. p. 301.

HAB. In the sea attached to rocks or various Algæ. Common on the shores of all the Hebrides, Mr TURNER, in Eng. Bot. Frequent in the Frith of Forth. Autumn.—In England, it has been found by Messrs TURNER and SOWERBY at Kynance Cove, Cornwall; and by the Reverend G. R. LEATHES in the Isle of Wight. Mr STACKHOUSE also found it, but WITHERING does not mention the station.

Plants gregarious, roundish, sometimes indistinctly lobed, often plicate beneath, rather soft, yet coriaceous. *Size* extremely various; from that of a pea to a small walnut. The surface is smooth and slippery; the interior hollow, and the substance in which the filaments are imbedded about $\frac{1}{8}$th of an inch thick. *Filaments* hyaline, much branched, jointed, dichotomous, the apices of the branches all terminating at the surface in dark club-shaped granules. *Duration* annual.

It is impossible, in the present state of our knowledge of the minuter algæ, to arrange them into satisfactory genera. LYNGBYE appears to me to have been more successful than any

other writer, and, from having discovered or described a number of new species, he had more materials to assist him in generalizing his observations. *Chætophora*, however, as established even by him, will, I am persuaded, not long be retained; and Mr GRAY has already divided it, though not judiciously. Until more is known respecting these plants, I prefer following LYNGBYE, whose definition of the genus is at least simple and easily understood.

According to him, we have in this country the following *Chætophoræ:*

Ch. *endivifolia*, Ulva incrassata, *Eng. Bot.* t. 967.
Ch. *elegans*, AG. Found by me near Edinburgh.
Ch. *marina*, Rivularia tuberiformis, *Eng. Bot.* but not quoted by LYNGBYE.

Mr GRAY has added to our flora Ch. *plana*, AG. which is not described by LYNGBYE; and as I have not seen it, I cannot determine whether it really belongs to the genus. Mr GRAY, as usual, has given us no authority for this new British plant, nor even mentioned where it was found.

Chætophora *marina*, in old age, seems, from the figure in English Botany, to burst and become lacerated,—a state in which I never found it. When floating in the sea, we are told in the same work, that it looks "extremely like an assemblage of young potatoes." I have not hesitated to re-figure it, as the habit is not correctly represented by SOWERBY, and the dissection imperfect: besides which, it is described in that excellent work as a new plant, an error it is desirable to correct.

In regard to the fructification, LYNGBYE is silent, except in calling the summits of the filaments granuliferous. These summits I certainly consider reproductive. The 3 or 4 seeds, disposed the one over the other, mentioned by Sir J. E. SMITH, I never could detect, nor has LYNGBYE noticed them. Mr GRAY's "spores" in the swollen joints are surely imaginary.

Fig. 1. *Plants, nat. size, on rock, and on Corallina officinalis.* Fig. 2. *A section of a full-sized plant, and of a small one at its full growth.* Fig. 3. *Masses of filaments, with their terminating granules.*

AMANITA MUSCARIA.

Fly Amanita.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Pileus stipitatus, volvatus, subtus lamellis sporuliferis, rectis, instructus. Stipes annulatus aut nudus.

Cap furnished with a stem and volva (wrapper), and bearing on its inferior surface straight sporuliferous lamellæ (gills). Stem either with a ring-like veil, or naked.

SPECIFIC CHARACTER.

AMANITA muscaria; *pileus margine striato, lamellis candidis; stipite subfarcto, bulboso; volva squamosa.*—(Fries).

Am. margin of the pileus striated; lamellæ white; stipes subsolid, bulbous; volva scaly.

AMANITA muscaria, *Pers. Disp. Meth. Fung.* p. 67.—*Ejusd. Syn. Fung.* p. 253.—*Alb. et Schw. Consp. Fung.* p. 143.—*Wahl. Fl. Lapp.* p. 527.—*Lam. Dict.* v. 1. p. 111.—*Hook. Fl. Scot.* Pt. 2. p. 19. *excl. var.* β.—*Schwein. Syn. Fung. Carol. a Schwaeg.* No. 548. (*Comm. Soc. Nat. Cur. Lips.*)—*Gray's Nat. Arr.* v. 1. p. 600.—*Grev. Fl. Edin. ined.*

AGARICUS muscarius, *Linn. Fl. Suec.* 1235.—*Hall. Hist.* 2375.—*Shæff. Fung.* t. 27.—*Lightf. Fl. Scot.* v. 2. p. 1010.—*Huds. Fl. Ang.* 2. p. 612.—*With. Bot. Arr.* ed. 6. v. 4. p. 234. *in part.*—*Bolt. Fung.* v. 1. t. 27.—*Sow. Fung.* t. 286.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 208.—*Ejusd. Syn.* p. 42.—*Purt. Mid. Fl.* v. 2. p. 630. & v. 3. p. 200. *in part.*—*Relh. Fl. Cantab.* ed. 3. p. 525.—*Nees, Syst.* t. 19. f. 166.—*Fries, Syst. Mycol.* v. 1. p. 16.

AGARICUS nobilis, *Bolt. Fung.* t. 46.

AGARICUS imperialis, *Batsch*, p. 59.—*Fl. Dan.* t. 1129. *fide Fries.*

AGARICUS pseudo-aurantiacus, *Bull. Champ.* t. 122.

AGARICUS rubens, *Scop. Fl. Carn.* p. 416.

FUNGUS bulbosus e volva erumpens, &c. *Mich. Nov. Pl. Gen.* p. 188. t. 78. f. 2.

β. *puella;* pileus destitute of warts. *Amanita puella, Schæff.* t. 28.

HAB. In woods throughout the whole kingdom in the autumn; extremely abundant in the Highlands of Scotland.

Pileus 3–6 inches broad, convex at first, at length nearly or quite plane, striated at the margin, mostly bright red or orange, but varying sometimes to liver-colour, yellowish, or even whitish, warty. *Warts* white or yellowish, prominent, pretty regularly scattered over the surface, sometimes wanting. *Lamellæ* adnate with the stipes, very numerous, broad, white. *Flesh* thick, white, partaking to a small depth of the colour of the pileus. *Stipes* smooth, white, very straight, subsolid, 4–8 inches high,

nearly an inch thick, bulbous at the base. *Veil* annular, white. *Volva* perfect only in extremely young plants, cracking immediately into pyramidal warts, which become less elevated, and more distant as the pileus expands, and generally leaving a few traces upon the bulb at the base of the stem.

This most splendid chief of the agaricoid tribe, really deserves the name of *imperial*, applied to it by BATSCH; for the most indifferent person must be attracted by the glowing hues of its ample pileus, its regular form, and tall pillar-like stipes:—eminently conspicuous, even at a distance, in the shaded recesses of its native woods. In the Highlands of Scotland, it is impossible not to admire it, as seen in long perspective, between the trunks of the straight fir-trees; and should a sunbeam penetrate through the dark and dense foliage, and rest on its vivid surface, an effect is produced by this chief of a humble race, which might lower the pride of many a patrician vegetable.

British botanists have described several distinct species under the name of Ag. *muscarius*, especially A. *asper*, PERS., A. *rubescens*, PERS. (*verrucosus*, CURT. *Fl. Lond.*), A. *vaginatus*, BULL., and even A. *Phalloides*, FRIES; all of which appear to be really distinct, and are retained as such by FRIES. They will be illustrated by correct figures in the course of this work.

Our present plant is universally considered deleterious, and instances are recorded of its having proved fatal to many who have eaten it. A variety of it, which grows in Kamschatka, is nevertheless constantly used to produce intoxication, which is done by mixing it with the juice of the berries of *Vaccinium uliginosum*, or the runners of *Epilobium angustifolium*. But the most powerful effect is produced by drying the fungus and swallowing it without mastication. This seems to bring on a state of inebriation, closely bordering upon delirium, and is usually accompanied more or less with spasmodic affections.—See Dr LANGSDORF's account in Annalen der Wetterauischen Gesellschaft für die gesammte Naturkunde, vol. i. p. 249.

Fig. 1. *A young plant.* Fig. 2. *The same divided.* Fig. 3. *A mature plant.* Fig. 4. *Section of the pileus of a larger specimen.* Fig. 5. *Sporules.*

GEOGLOSSUM VISCOSUM.

Slimy Earth-tongue.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Hymenium breve, claviforme, stipitatum, plerumque compressum, a stipite subdistinctum sed vero discretum.—Genus colore nigricante vel obscure viridi.

Hymenium short, club-shaped, furnished with a stem, mostly compressed, somewhat confluent with the stem, but truly distinct.—A genus in which black or dull green is the predominating colour.

SPECIFIC CHARACTER.

GEOGLOSSUM viscosum; *glabrum, nigrum, viscosum, hymenio tereti, cum stipite plus minusve confluente.*

G. glabrous, black, glutinous, hymenium rounded, more or less confluent with the stem.

GEOGLOSSUM viscosum, *Pers. Comment.* p. 39.—*Ejusd. Syn. Fung.* p. 609.—*Ejusd. Mycol. Europ.* v. 1. p. 197.—*Fries, Syst. Mycol.* 1. p. 489.—*Grev. Fl. Edin ined.*

HAB. Moist pastures. Foxhall, Captain WAUCH. October.

Subgregarious, carnoso-coriaceous, 1–2 inches in height, black, paler with a brown tinge at the base of the stipes, which is slender, glabrous, cylindrical, slimy, especially in moist weather. *Hymenium* black, confluent with the stem, sometimes of the same diameter, at others somewhat thicker, and of an oblong form; obtuse at the apex, rounded, not compressed. *Sporuliferous* elongated *cells*, occupying the whole surface of the hymenium, and containing 3 linear, dark bodies (sporules?).

This species is chiefly distinguished by its cylindrical or rounded hymenium; that of G. *glutinosum* (to which species it is most nearly allied) being compressed. In Great Britain, five true *Geoglossa* have been found, *hirsutum*, *glabrum*, *viscosum*, *atro-purpureum*, and *viride*. The last, which is a rare and beautiful species, was brought to me in autumn (1822) from the banks of the Tweed by my friend Mr WALKER ARNOTT. G. *atro-purpureum*, I insert on Mr GRAY's authority, though, (as in another instance quoted in the present number) he does not mention where or by whom his plant was

found. The five other plants added by that author to *Geoglossum*, belong to other genera.

The *hymenium* of this genus is unlike that of any other, and I confess I do not perfectly understand it. FRIES quotes BULLIARD, who says, *Sporidia G. glabri nigra;* but adds immediately afterwards, *in G. glabro aliisque mihi alba!* PERSOON, in his Mycologia, observes, *thecæ majores, disjunctæ.* It is evident, a more minute dissection is requisite; and I have endeavoured to ascertain the precise nature of the bodies which the thecæ or hyaline cells contain, which, it seems to me PERSOON has mistaken for the thecæ themselves. In the present species, and in G. *hirsutum*, I have submitted them to every power of my microscope, and can only perceive the appearance which I have given in the plate: three linear, dark-brown bodies in both cases, overlap each other, so as to be conveniently disposed in the transparent cells from which they escape, sometimes all at once, sometimes singly. I have not been able to detect the least appearance of these dark bodies containing sporules; and if they do not, they must be regarded as the sporules themselves.

Fig. 1. *Plants, nat. size, in different states, some approaching in form to G. glabrum; the uppermost splitting from decay.* Fig. 2. *A section of an entire plant.* Fig. 3. *Cells or thecæ, with their dark linear sporules?*

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LEOTIA LUBRICA.

Gelatinous Leotia.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Pileus stipitatus, rotundatus, carnosus vel gelatinosus, margine revoluto, supra margineque hymenio vestitus. Hymenium undulatum vel læve, persistens. Cellulæ sporuliferæ fixæ, clavatæ.

Pileus furnished with a stipes, rounded, fleshy or gelatinous, revolute at the margin, which, as well as the upper surface, is occupied by the undulate or even, persistent hymenium. Sporuliferous cells fixed, clavate.

SPECIFIC CHARACTER.

LEOTIA lubrica; *tremellosa; pileo tumido, repando, olivaceo, margine rotundato; stipite flavo, cylindrico vel inæqualiter compresso.*

L. tremellose; pileus tumid, spreading, olivaceous, the margins rounded; stipes yellow, cylindrical or unequally compressed.

LEOTIA lubrica, *Pers. Syn. Fung.* p. 613.—*Ejusd. Mycol. Europ.* v. 1. p. 201. t. 9. figs. 4–7. *(varieties).*—*Alb. et Schwein. Conspect. Fung.* p. 298.—*Moug. et Nestl. Pl. Exsicc.* No. 583.—*Gray's Nat. Arr.* v. 1. p. 660.—*Schwein. Fung. Carol.* No. 1122.—*Fries, Syst. Mycol.* v. 2. p. 29.

LEOTIA gelatinosa, *Hill, Hist.* No. 34. *fide Fries.*

HELVELLA gelatinosa, *Bull. Champ.* p. 296. t. 473. f. 2.—*Sow. Fung.* t. 70.—*De Cand. Fl. Franç.* ed. 3. v. 2. p. 95.—*Ejusd. Syn.* p. 19.—*Relh. Fl. Cantab.* ed. 3. p. 551.—*Purt. Midl. Fl.* v. 3. p. 259.—*With. Bot. Arr.* ed. 6. v. 4. p. 407.

HELVELLA lutea, *Berg. Phyt.* v. 1. t. 151.

HELVELLA flavo-virens, *Nees' Syst.* t. 18. f. 162.

HELVELLA revoluta, *Afz. sec. Fries.*

ELVELLA lubrica, *Scop. Fl. Carniol.* v. 2. p. 477.

HYGROMITRA tremula, *Nees' Syst.* t. 15. f. 144.

MERULIUS lubricus, *Schum. Sælland.* p. 368. *fide Fries.*

PHALLUS lubricus, *Œd. Fl. Dan.* t. 719.

CLAVARIA tremula, *Holmsk. Coryph.* v. 1. p. 27. *with a fig.*

PEZIZA cornucopiæ, *Hoffm. Veg. Crypt.* 2. p. 21. t. 6. f. 1.

FUNGUS gelatinus flavus, *Vaill. Par.* p. 201. t. 11. f. 7–9.

FUNGOIDASTER parvus, gelatinosus, lubricus, &c. *Mich. Nov. Gen.* p. 201. t. 82. f. 2.

HAB. Woods on the moist soil and among dead leaves. Foxhall, Captain WAUCH. Balmuto.—In England, it has been found by RELHAN in several places in Cambridgeshire: by Mr W. B. PIERCY in Oversley Wood; and Mr SOWERBY mentions it as having been found by him in various woods in the autumn.

Gregarious, often tufted and crowded, 1–3 inches in height or even more, gelatinous, in old age often drying up and becoming corneous. *Pileus* scarcely ever an inch in breadth, tumid, lubricous, thickish, somewhat plane, but quickly rounded towards the margin, which is rather undulate, and, if not in perfection, more or less contracted towards the stipes; this is not the case when the pileus is very tumid, and exactly mature (vide Fig. 2.), a state in which it remains a very short time. *Interior* of the pileus very gelatinous and moist, soon contracting from the evaporation of the moisture, and in age hard, variously wrinkled and distorted, and almost greenish-black. *Colour* mostly olivaceous, but varying to different shades of green. *Hymenium* occupying the whole surface and even margin. *Sporuliferous cells* elongate, linear-clavate, the sporules jointed, about 5 in each cell. *Stipes* yellow, or tinged with green, subequal, solid, or hollow (mostly the latter in old plants), passing into the pileus, sometimes slightly pitted, often compressed, especially in age, when it becomes of a deeper yellow, and corneous.

Few Fungi have received a greater number of generic names than the present one; and it may also be said that few assume so many appearances, depending on age alone. In the mature state, however, I apprehend there can be no difficulty in recognizing it, though the colour is apt to vary; and in the description, I have put the botanist on his guard against the change which is induced by old age.

A singular variety is figured by HOLMSKIOLD, and which is copied into the System of NEES AB ESENBECK, having a long attenuated root or rather base of the stem. Other curious varieties are also given by PERSOON, in the ninth Plate of his *Mycologia Europæa*.

Helvella clavata of WITHERING, which DE CANDOLLE and FRIES have quoted, certainly belongs, as Mr PURTON has justly remarked, to *Spathularia flavida* of PERSOON.

This is a small genus, and is divided by FRIES into two sections.

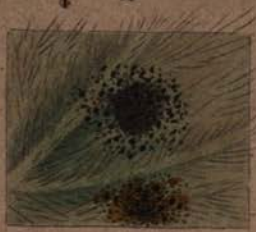
I. CUCULARIA. *Pileus carnosus, margine revolutus.*
II. HYGROMITRA. *Pileus gelatinosus, subclavatus.*

Our plant belongs to the second, and we have one other British species (*L. infundibuliformis Helvella*, SOW.), which belongs to the first.

Fig. 1. *Plants in different stages of growth, of the most common variety.* Fig. 2. *A mature plant, with a section of the pileus.* Fig. 3. *Sporuliferous cells.* Fig. 4. *Sporules.*

1

2



3

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PUCCINIA POTENTILLÆ.

Obtuse long-pedicelled Puccinia.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *GASTROMYCI, Grev.*—EPIPHYTÆ, *Link.*

GENERIC CHARACTER.

Peridium verum 0. *Sporidia uni- aut multiloculata, pedicellata, pedicello fixa, et in cæspitulis foliis vivis parasiticis, aggregata. Epidermis foliorum peridio simillima.*

True peridium 0. Sporidia, one or many-celled, pedicellate, fixed by the pedicel, and growing in minute clusters or tufts on living leaves. The epidermis bearing a strong resemblance to a peridium.

SPECIFIC CHARACTER.

PUCCINIA Potentillæ; *hypophylla, sparsa, nigra; sporidiis cylindricis, 3–4-loculatis, obtusis; pedicello albo filiformi.*

P. on the lower surface of the leaf, scattered, black; sporidia cylindrical, 3–4-celled, obtuse; pedicel white, filiform.

PUCCINIA Potentillæ, *Pers. Syn. Fung.* p. 229.—*Alb. et Schwein. Conspect. Fung.* p. 133.—*De Cand. Syn. Fl. Gall.* p. 44.—*Fl. Franç.* v. 6. p. 54.—*Gray's Nat. Arr.* v. 1. p. 543.

UREDO obtusa, *Strauss, in Annal. Soc. Wetterav.* v. 2. p. 107.

HAB. On the inferior surface of the leaves of *Potentilla Fragaria, argentea, verna,* and *Tormentilla* (*Tormentilla erecta,* Auct.) Summer and Autumn. My specimens were gathered at Rosslyn.

Black, tufted, scattered, small, often growing along with the orange *Uredo Potentillæ. Sporidia* mostly cylindrical, very obtuse at the apex, 3–4-celled, very rarely 5-celled, reddish under the microscope, and contracted at the dissepiments. *Pedicel* filiform, pale, hyaline.

This species approaches most nearly to P. *Rosæ*, already figured in this work, and has also considerable affinity with P. *Rubi*, but is essentially different from both, in being simply obtuse at the apex of the sporidia, the others being mucronate. The pedicel is also filiform to the base, instead of being more

or less incrassated, and the yellow gland at the foot of the pedicel, which so well distinguishes P. *Rosæ*, is here altogether wanting.

Fig. 1. *Plant, nat. size, on a leaf of Potentilla Fragaria.* Fig. 2. *Plants magnified.* Fig. 3. *Sporidia.*

a
b
b
a

PENICILLIUM GLAUCUM.

Glaucous Pencil-Mould.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *BYSSOIDEÆ, Grev.*—MUCEDINES, *Link.*

GENERIC CHARACTER.

Flocci minuti, septati, simplices aut ramosi, plus minusve cæspitosi, fertilibus erectis, apice penicillatis. Sporulæ numerosissimæ, ad apices in capitulum congestæ.

Woolly filaments minute, jointed, simple or branched, more or less tufted, the fertile ones erect, with a pencil-like tuft of branches. Sporules numerous, crowded at the summits into a little head.

SPECIFIC CHARACTER.

PENICILLIUM glaucum; *densè cæspitosum, effusum, capitulis sporularum demum glaucis.*

P. densely tufted, spreading; heads of sporules at length glaucous.

PENICILLIUM glaucum, *Link, Berl. Mag.* 3. 17. t. 1. f. 24.—*Pers. Mycol. Europ.* v. 1. p. 40.

PENICILLIUM expansum, *Nees' Syst.* t. 4. f. 59.—*Link, loc. cit.* p. 17.—*Gray's Nat. Arr.* v. 1. p. 554.

HAB. On various putrefying substances, as fungi, fruit, &c. Very common, at all seasons.

Tufts composed of minute woolly filaments, about $\frac{1}{8}$th or $\frac{1}{10}$th of an inch high, rounded or spreading, the whole white at first, at length becoming glaucous. *Plant*, like the rest of the genus, composed of two kinds of filaments interwoven together; *barren ones* decumbent, and simple to the apex; *fertile ones* erect, and divided at the top into a small tuft of subulate branches, among which the sporules are profusely disposed, and form a little head. They are not moniliform, or arranged in a beaded manner, as in the genus *Aspergillus*.

When I undertook the illustration of this species, I determined to spare no labour in examining and comparing the different authors who have been supposed to describe it, from the time of MICHELI; but I found the whole involved in such inextricable confusion, that I have merely given such authorities as are unquestionable. Authors in general, seem to have copied more or less from each other, and, by far the greater proportion of synonymes may safely be pronounced not to belong to our plant. That figured by MICHELI, t. 91. f. 3., which is

always referred to, and which PERSOON even cites in his Mycologia, certainly is something else. So also is *Muçor penicillatus* of BULLIARD, and *Mucor cæspitosus* of BOLTON, and other botanists. *Mucor crustaceus* of LINNÆUS no mycologist would now venture to identify; and as to *Monilia digitata* of PERSOON's Synopsis, he quotes the figures of BOLTON's *Mucor cæspitosus* and BULLIARD's *Mucor penicillatus* without a question, both of which are totally at variance with *Penicillium glaucum*. Several of these evidently erroneous synonymes he has continued in his new work, though he has adopted the genus and the species of LINK.

Fig. 1. a, *P. glaucum on a decaying Agaric;* b, *Fertile and barren filaments, with sporules, magnified.*

PENICILLIUM SPARSUM.

Scattered Pencil-Mould.

SPECIFIC CHARACTER.

PENICILLIUM sparsum; *floccis sterilibus, effusis, implexis, fertilibus simplicibus, subsparsis, capitulis sporarum candidis.*

P. barren filaments, effused, interwoven; fertile ones simple, somewhat scattered; heads of sporules white.

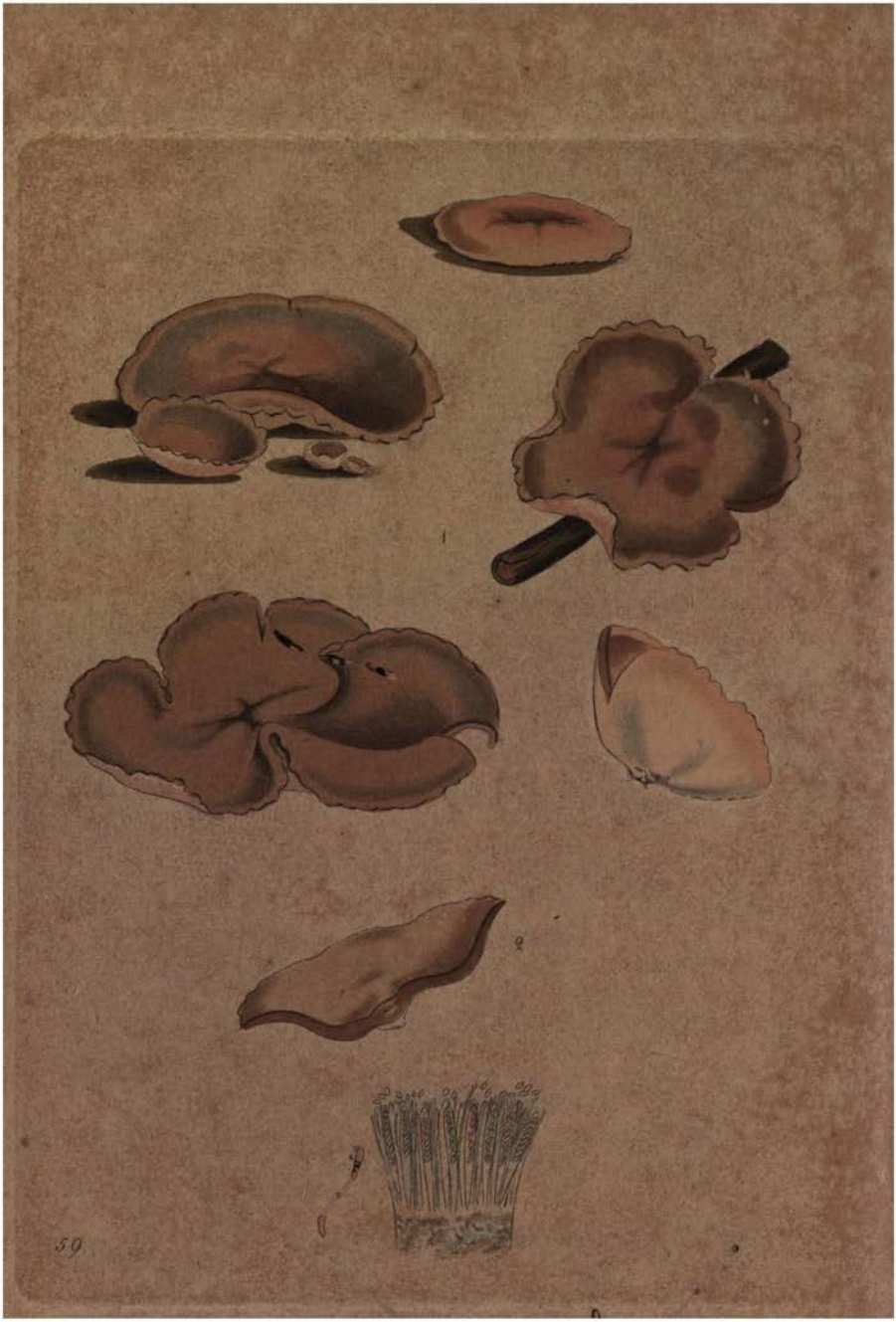
PENICILLIUM candidum, *Grev. in Wern. Trans.* v. 4. p. 71. *excl. syn.*

HAB. On the semiputrid stems of plants, in Autumn. On decaying *Arctium Lappa*, near Edinburgh.

This species forms whitish spots of half to one inch in length, and several lines wide, upon the semiputrid stems of herbaceous plants. These spots are produced by the barren filaments, and on them the fertile ones, with their pure white heads of sporules, are visible to the naked eye.

From all the other species of this beautiful microscopic genus, the present one is abundantly distinct, in its scattered fertile filaments, rising from the broad web-like tufts of the decumbent ones, and in the white sporules.

Fig. 2. a, *P. sparsum, nat. size.* b, *Filaments and sporules magnified.*



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PEZIZA REPANDA.

Flattish brown Peziza.

CLASS AND ORDER CRYPTOGAMIA FUNGI, *Linn.*—NAT. ORD. *FUNGI, Link, Grev.*

GENERIC CHARACTER.

Pileus stipitatus aut sessilis, plus minusve cupuliformis vel complanatis, cellulis elongatis sporuliferis, in pagina superiore.

Pileus sessile or stipitate, dilated upwards into a variable, cup-shaped or flattish receptacle, having sporules contained in elongated cells, whose summits terminate on the superior surface.

SPECIFIC CHARACTER.

PEZIZA repanda; *sessilis, solitaria vel subcæspitosa, magna, primo hemisphærico-concava demum explanata, intus subrugosa fusca, extus farinosa, albida, margine crenata.*

P. sessile, solitary, or somewhat tufted, large, at first hemispherical and concave, at length nearly plane, subrugose and brown within, the outer surface farinose, whitish; margin crenate.

PEZIZA repanda, *Wahl. Ups.* p. 466.—*Fries, Syst. Mycol.* v. 2. p. 51.
PEZIZA granulosa, *Schum. Sælland.* p. 416.—*Pers. Mycol. Europ.* v. 1. p. 225.
PEZIZA coronata, *Jacq. Misc.* v. 2. p. 140. t. 10. *fide Fries.*—*Pers. loc. cit.* p. 231.

HAB. On the ground, chiefly in beech-woods. Autumn. Under beech-trees at Foxhall, Messrs WAUCH and GREVILLE.

Solitary, or several growing close together in a tufted manner, sessile, large, 1–4 inches broad, carnose, brittle, very concave while young, but gradually expanding till it frequently becomes quite plane, sometimes splitting at the edge, but often entire, waved and somewhat lobed. *Margin* crenate, and somewhat reflexed. *Colour* of the hymenium dilute brown, of various shades; outer surface whitish, pulverulent. The base is often plicate and radicating. Pileus when splitting never convolute.

I am happy in being able to give a characteristic figure of a rare *Peziza*, and one of that group which, as FRIES justly observes, contains many, difficult to distinguish as species or varieties.

The above-named author has been at great labour in the divisions of this enormous genus, and has done much towards its elucidation. Our present species is contained in his first series;

I. ALEURIA. *Carnosæ vel carnoso-membranaceæ, pruinosæ, vel floccoso-furfuraceæ.* Subterrestres.

1. HELVELLOIDEÆ. *Cupula semper aperta (Discina) vel junior connivens.* Magnæ terrestres.

††† Pustulatæ. *Subsessiles, integræ, centrales, extus granulosæ vel verrucosæ.*

This last division contains 10 species, of which P. *repanda* is the first, P. *cerea* and P. *vesiculosa*, both figured by SOWERBY (the latter admirably), are the only others hitherto found in this country.

A striking characteristic of this small group is, that the pileus never becomes convolute when split.

Fig. 1. *Plants in various stages and forms.* Fig. 2. *A section.* Fig. 3. *Sporuliferous cells and sporules.*

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